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ABSTRACT

The purposes of this study were to develop a conceptual rationale that might serve as the basis for a model of the change process and to test hypotheses derived from the rationale. It was believed that this approach would make a contribution to a growing body of research which views the school in the broader context of organizational theory. The rationale of the study was based on the assumption that the superintendent and the principal play a significant role in the adoption of new practices. The administrator's behavior relative to the adoption of new practices was thought to depend on his perceived need for change and his perceived power to innovate. Change was expected to occur only when the administrator both perceived a need for change and saw himself as having the power to bring about the change. The findings of the study demonstrate the value of these concepts. An administrator's perceived need for change and perceived power to innovate are thought to be determined by personal attributes, the characteristics of the organization, and the interaction between the individual and institutional variables. (Appendix A may reproduce poorly.) A 32-item bibliography is included. (Author/WM)

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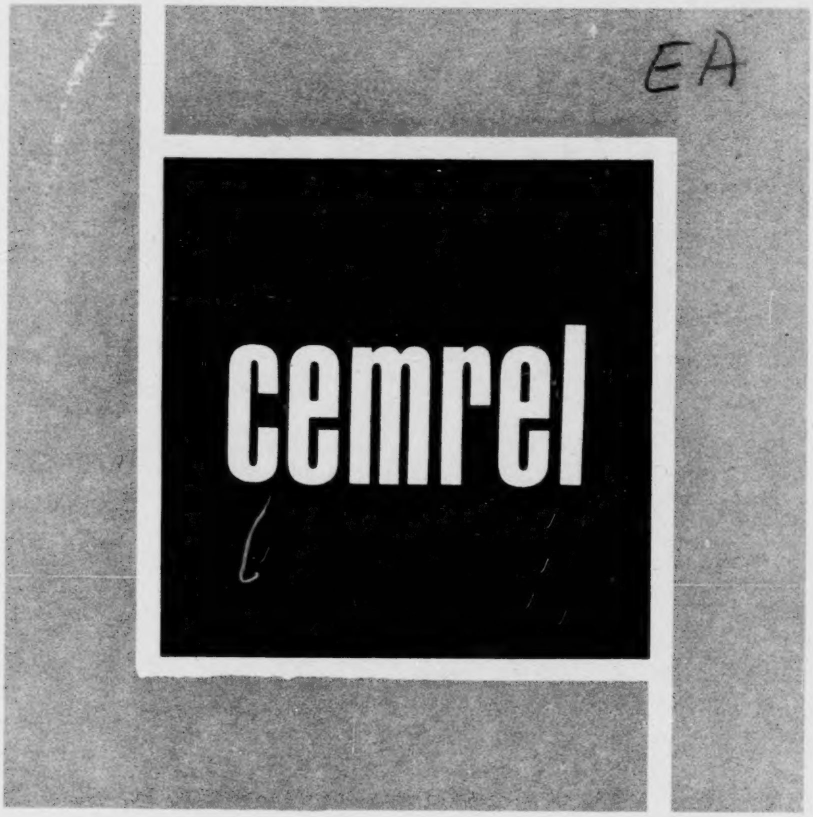

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FINAL REPORT

INNOVATION RELATED TO THE TENURE, SUCCESSION PATTERN AND REFERENCE GROUP ORIENTATION OF THE PRINCIPAL

James A. Reynolds

and

Larry J. Reynolds

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TABLE OF CONTENTS

Chapter Page

I INTRODUCTION 1

Overview of Procedures 4

Plan of the Report 5

II RATIONALE OF THE STUDY 8

The Superintendent and Innovation 10

The Principal and Innovation 11

Determinants of Administrative Behavior 14

Joint Consideration of Perceived Need for Change and Perceived Power to Innovate 22

Determinants of Perceived Need for Change and Perceived Power to Innovate 23

The Model 30

III METHODOLOGY 33

The Independent Variables 34

The Intervening Variables 37

The Dependent Variable 41

Control Variables 45

Statistical Analysis 45

Supplementary Variables 48

Supplementary Procedures 49

IV THE PRINCIPAL'S ANALYSIS 52

The Secondary Principal's Analysis 52

The Elementary Principal's Analysis 69

Chapter Page

V THE SUPERINTENDENT'S ANALYSIS 80

Part 1: Relationship Between Independent and Dependent Variables 82

Part 2: Relationship Between Independent and Intervening Variables 95

Part 3: Relationship Between Intervening and Dependent Variables 113

The Reformulated Model 115

VI THE JOINT ANALYSIS 116

Methodological Considerations 116

Analysis and Discussion 118

VII DISCUSSION 130

The Individual Concepts 130

The Model and Building Innovation 138

The Best Unit of Analysis 140

The Relative Importance of the Superintendent and Principal 142

Conclusions 143

REFERENCES 146

APPENDICES 150

A. The Questionnaires 151

B. Principal Axis Factor Matrix for the 21 Items from the "Perceived Need for Change" and "Perceived Power to Innovate" 165

LIST OF TABLES

Table Page

1 Administrators Categorized by Perceived Need for Change and Perceived Power to Innovate 23

2 Questionnaire Returns Categorized by Position of Recipient 33

3 Distribution of Local-Cosmopolitan Scores 37

4 Rotated Item Factor Matrix for the 21 Items from the Perceived Need for Change and Perceived Power to Innovate Scales 40

5 The Number of Districts Adopting 19 Elementary Innovations During Each of 5 Time Periods 42

6 The Number of Districts Adopting 23 Secondary Innovations During Each of 5 Time Periods 43

7 The Distribution of Cases Among Treatment Conditions for the Analysis of Covariance 47

8 Simple Correlation between the 3 Independent Variables . . 53

9 The Simple Correlation of the Control Variables with the Other Variables of the Study 53

10 Summary of Means and Standard Deviations for Each of the Eight Cells in the Secondary Principals Analysis 54

11 Analysis of Covariance Summary Table of Significance of Difference in Innovation Among Secondary Principals Who Differ in Tenure, Succession Pattern, and Reference Group Orientation 55

12 Simple Correlation Matrix for 9 Variables Associated with Secondary Innovation 58

13 Partial Correlations for the Relationship between Innovation and Succession, Reference Group Orientation and Size . . 65

14 Partial Correlations for the Relationship between Expenditure, Size, Tenure, Succession Pattern, and Reference Group Orientation 67

15 Simple Correlations Among the 3 Independent Variables . . 69

Table | Page

16 The Simple Correlation of the Control Variables with Other Variables of the Study 70

17 Summary of Means and Standard Deviations for Each of the Eight Cells in the Elementary Principals Analysis 70

18 Analysis of Covariance Summary Table of Significance of Difference in Innovation Among Elementary Principals Who Differ in Tenure, Succession Pattern, and Reference Group Orientation 71

19 Matrix of the Simple Correlations Among the Variables Considered in the Analysis of Elementary Innovation . . . 74

20 Regression Analysis for the Relationship Between 8 Variables and Elementary Innovation 76

21 Step-Wise Regression for 8 Variables Related to Elementary Innovation 77

22 Partial Correlations for 3 Variables that Relate to Elementary Innovation 78

23 Simple Correlations Between the 3 Independent Variables . 82

24 The Simple Correlation of the Control Variables with Other Variables of the Study 83

25 Summary of Means and Standard Deviations for Each of the Eight Cells in the Superintendent's Analysis 84

26 Analysis of Covariance Summary Table of Significance of Difference in Innovation Among Superintendents Who Differ in Tenure, Succession Pattern and Reference Group Orientation 85

27 Simple Correlation Matrix for 12 Variables Related to the Superintendent's Analysis 89

28 The Partial Correlations Between Age and Innovation and Between Tenure and Innovation 91

29 Partial Correlations for the Relationship between Innovation and Succession Pattern and Reference Group Orientation 93

30 Partial Correlations for the Relationship between Innovation and Size, Succession Pattern and Reference Group Orientation 94

Table Page

31 Summary of Perceived Need for Change Means and Standard Deviations for Superintendents Who Differ in Tenure, Succession Pattern and Reference Group Orientation . . . 96

32 Analysis of Variance Summary Table of Significance of Differences in Perceived Need for Change Among Superintendents Who Differ in Tenure, Succession Pattern and Reference Group Orientation 97

33 Partial Correlations for the Relationship Between Perceived Need for Change and Succession Pattern and Reference Group Orientation 100

34 Partial Correlations for the Relationship Between Perceived Need for Change and Size, Succession Pattern and Reference Group Orientation 101

35 Variables Eliminated from Step-Wise Regression with Perceived Need for Change as the Dependent Variable . . . 103

36 Variables Retained in a Step-Wise Regression with Perceived Need for Change as the Dependent Variable . . . 104

37 Summary of Perceived Power to Innovate Means and Standard Deviations for Superintendents Who Differ in Tenure, Succession Pattern and Reference Group Orientation 105

38 Analysis of Variance Summary Table of Significance of Differences in Perceived Power to Innovate Among Superintendents Who Differ In Tenure, Succession Pattern, and Reference Group Orientation 106

39 Partial Correlations for the Relationship Between Perceived Power to Innovate and Size, Reference Group Orientation and Board Attitude Toward Change 109

40 Variables Eliminated from Step-Wise Regression with Perceived Power to Innovate as the Dependent Variable . . 111

41 Variables Retained in a Step-Wise Regression with Perceived Power to Innovate as the Dependent Variable . . 111

42 Innovation Means for Superintendents Who Differ in Perceived Need for Change and Perceived Power to Innovate . 114

43 Results of T-Test for Differences Between Mean Innovation Scores for Groups 1, 2 and 3 and Group 4 114

Table Page

44 The Variance in Secondary Innovation Explained by Three Variables Related to the Superintendent 119

45 The Variance in Secondary Innovation Explained by Three Variables Related to the Principal 119

46 The Variance in Secondary Innovation Explained by 3 Variables Associated with the Superintendent and 3 Variables Associated with the Principal 120

47 The Variance in Secondary Innovation Explained by 3 Variables Associated with the District 121

48 Percent of the Variance in Secondary Innovation Explained by 3 Sets of Variance 122

49 Secondary Innovation Predicted by 16 Variables 123

50 The Variance in Elementary Innovation Explained by Three Variables Related to the Superintendent 124

51 The Variance in Elementary Innovation Explained by Three Variables Related to the Principal 125

52 The Variance in Elementary Innovation Explained by 3 Variables Associated with the Superintendent and 3 Variables Associated with the Principal 126

53 The Variance in Elementary Innovation Explained by 3 Variables Associated with the District 126

54 Percent of the Variance in Elementary Innovation Explained by 3 Sets of Variables 127

55 Elementary Innovation Predicted by 16 Variables 128

56 Principal Axis Factor Matrix for the 21 Items from the "Perceived Need for Change" and "Perceived Power to Innovate" 165

LIST OF FIGURES

Figure Page

1 Relationships Predicted in the Minor Hypotheses 32

2 Simple Correlations Among Size, Succession Pattern, Reference Group Orientation and Innovation 59

3 Directions of Causality Among Size, Succession Pattern, Reference Group Orientation and Innovation 61

4 Case 1 Where the Relation Between X and Y is Spurious . . . 62

5 Case 2 Where Z is an Intervening Variable 62

6 Causal Relationships for Examining Succession Pattern . . . 63

7 The Simplified Causal Model for Succession Pattern 64

8 The Simplified Causal Model for Reference Group Orientation 66

9 The Simple Correlations Among District Size, Succession Pattern, Reference Group Orientation, and Elementary Innovation 73

10 Relationships Examined in Part 1 80

11 Relationships Examined in Part 2 81

12 Relationships Examined in Part 3 81

13 The Interaction Between Tenure and Succession Pattern . . . 87

14 The Simple Relationship Among Age, Tenure and Innovation . 90

15 The Causal Relationship Among Size, Succession Pattern, Reference Group Orientation and Innovation 92

16 The Simplified Causal Model for Succession Pattern 92

17 The Simplified Causal Model for Reference Group Orientation 94

18 Simple Correlations Among Size, Succession Pattern, Reference Group Orientation, and Perceived Need for Change 99

19 Simplified Causal Model for Succession Pattern 100

20 Simplified Causal Model for Orientation 101

Figure Page

21 The Reformulated Model for Perceived Need for Change . . . 102

22 Simple Correlations Among Size, Succession Pattern, Reference Group Orientation, and Perceived Power to Innovate 107

23 Simple Correlation Among Size, Reference Group Orientation, Board Attitude Toward Change and Perceived Power to Innovate 108

24 The Altered Model for Perceived Power to Innovate 109

25 The Reformulated Model for Perceived Power to Innovate . . 112

26 The Reformulated Innovation Model 115

27 The Reformulated Innovation Model 138

CHAPTER I

INTRODUCTION

Despite the increase in the rate of innovation since the firing of Sputnik I a decade ago, it remains true that school systems, like other social institutions, tend to remain relatively stable and to resist efforts to impose major changes. Considerable attention has been devoted to the design of new programs in education, but comparatively little attention has been given to the process by which change is brought about. The efforts directed toward the improvement of methods, materials, and curricula are doomed to have little impact upon education as experienced by children in classrooms across the country unless effective means are found for implementing these programs.

There is need for concerted effort directed toward the identification of the important elements in the change process and the discovery of relationships between these elements. The development and refinement of successive models of the change process will eventually result in a model that will assist the researcher in describing, explaining, and predicting change. The validity of the model is dependent upon its effectiveness in predicting change.

The model will also provide a conceptual framework for the practioner who is interested in controlling the course of events in school systems. The utility of the model will be determined by its value as a guide to action.

The purpose of the study was: a) to develop a conceptual rationale which might serve as the basis for a model of the change process, and b) to test hypotheses derived from the rationale. It was believed that this approach would make a contribution to a growing body of research which views the school in the broader context of organizational theory. It was also felt that such a model would help to increase our understanding of the dynamics of change and that this understanding might serve as a basis for training change agents.

The present study is an extension and elaboration of an earlier study by Reynolds (1965). The original study presented a model which related three attributes of the superintendent to the rate of innovation in the school district he serves. During the course of this study it was found that the correlation between elementary and secondary innovation was .19. This low correlation suggested the value of investigating elementary and secondary innovation separately. It further suggested that the principal, rather than the superintendent, might be the administrator of consequence. The model developed in the earlier study by Reynolds (1965) is built upon the belief that the administrator is an important determiner of the change that occurs in a school district. Superintendents will attempt to innovate when they see a need for change and believe that they have the power to successfully initiate a new program. Innovation will occur only when a perception of need and power exist simultaneously.

The administrator's perception of the need for change and his perception of his own power to innovate were thought to be influenced by the manner in which he relates to the organization. The superintendent's tenure, succession pattern, and reference group orientation were thought to be important in determining the superintendent's relationship to the organization.

The expected relationships between the tenure, succession pattern, and reference group orientation of the principal are stated in the following hypotheses:

1. The rate of innovation in an organization is inversely related to the tenure of the principal.

2. The rate of innovation in an organization will be greater if the successor to the principal is from outside the organization than if he is from inside the organization.

3. The rate of innovation will be greater if the principal has a "cosmopolitan orientation" than if he has a "local orientation."

The concepts used in the hypotheses were defined as follows:

Innovation is "a deliberate, novel, specific change, which is thought to be more efficacious in accomplishing the goals of a system." (Miles, 1964).

Tenure is the length of time which an individual has occupied a position. (It does not represent the length of time in a school system.)

Outside Successor is a principal who held a position in another district immediately preceding his appointment as principal.

Inside Successor is a principal who held another position in the district immediately preceding his appointment as principal.

Cosmopolitan is an individual whose orientation is external to a particular social system.

Local is an individual whose orientation is internal to a particular social system.

The first hypothesis is similar to a hypothesis presented by Griffiths (1964) and is related to propositions tested by Todd (1963) and Carlson (1961). The second hypothesis was proposed and investigated by Carlson (1961) and later presented by Griffiths (1964) as a part of his theory of administrative change based upon systems theory. The third hypothesis makes use of the concepts cosmopolitan and local orientation which were developed by Merton (1957), later used by

Gouldner (1957), and reported by Rogers (1962) and others to be significant in innovative behavior.

If the hypothesized relationships are found, they will provide support for the model and indicate that the variables included are important in understanding innovation in school districts. The added knowledge about tenure, succession pattern, and reference group orientation should have value in developing strategies for change in school systems.

A second aspect of the study involves a re-analysis of the data pertaining to the superintendent. This re-examination uses additional variables not included in the original analysis and uses modified statistical procedures. It is hoped that the re-analysis will lead to a reformulated model which will more completely explain innovation in school districts.

A third aspect of the study involves a comparison of the degree to which three groups of variables are useful in explaining innovation. The three classes of variables relate to: a) the superintendent, b) the principal, and c) the district. This portion of the study takes as its purpose, determination of whether the district or the individual building is the most appropriate unit of analysis in studies concerned with innovation. It should also provide information about the associated question of whether the principal or superintendent is more important in innovation.

Overview of Procedures

The data used in this study were collected as a part of an earlier study by Reynolds (1965). Only the portion relating to the superintendent was analyzed in the former study. Questionnaires were sent to superintendents and principals in 183 Missouri and Illinois school districts that provided both elementary and secondary education and were accredited by the North Central Association of Colleges and Secondary Schools. An 81 per cent return was received. When there was more than one elementary or secondary school in a district, one was randomly selected as representative of the group.

The principals used a check list to indicate the educational practices adopted during a four year period. The list of 19 elementary and 23 secondary innovations was selected from practices being diffused through schools such as those in Missouri and Illinois.

The size of the district and the expenditure level served as control variables. This was done in order to assess the true relationship between the dependent and independent variables.

The principal's analysis and the superintendent's re-analysis utilized a 2 x 2 x 2 analysis of covariance design and multiple regression. The first procedure permits the examination of interaction effects and the second makes more complete use of the available data.

Plan of the Report

Chapter II presents the rationale for the study. The rationale includes a selected review of studies reporting findings related to the concepts used in this study and to discussions of innovation which are based upon a theoretical statement. Attention is also given to previous investigations of tenure, succession pattern and reference group orientation. The chapter concludes with a statement of the hypotheses and a diagram of the anticipated relationships.

Chapter III pertains to the methodology employed in the study. Each of the variables of the study is considered. Attention is also given to the statistical techniques utilized.

Chapter IV is concerned with the principal's analysis. Three hypotheses related to the effect of the principal's tenure, succession pattern and reference group orientation on innovation are tested. The methods of causal inference are used to further examine the relationships between variables.

Chapter V presents the re-analysis of the superintendent's data. This re-examination is composed of three parts: a) consideration of the relationship between the independent variables; tenure, succession pattern, and reference group orientation; and the dependent variable, district innovation; b) the relationship between the independent variables and the intervening variables, perceived need for change and perceived power to innovate; and c) the relationship between the intervening and the dependent variables.

Chapter VI presents the joint secondary and joint elementary analysis. This analysis involves the joint consideration of variables associated with the principal and superintendent. The first part of the chapter deals with secondary innovation and the second with elementary innovation. This chapter also considers the total amount of variance in secondary and elementary innovation that can be accounted for by all of the variables of the study.

Chapter VII discusses the findings and analyses of the study. It re-examines the concepts of the study, the value of the model for examining building innovation, compares the building and the district as a unit for analysis, and considers the relative importance of the superintendent and principal in innovation. This chapter closes with a statement of conclusions.

CHAPTER II

RATIONALE OF THE STUDY

Innovation has been defined as "a deliberate, novel, specific change, which is thought to be more efficacious in accomplishing the goals of a system" (Miles, 1964, p. 14). The deliberate and specific nature of the change makes innovation distinct from changes which evolve over a period of time as a result of changing conditions. Thus, innovation as defined involves a decision by an individual, group, or organization.

The concept of decision-making seems to provide a meaningful way of examining the manner in which organizations decide to accept or reject a new idea. As Dill (1964, p. 200) has indicated, it may serve as a basic framework for organizational analysis and it has the advantage of sympathetic connections with other disciplines.

The process used to make decisions about change is similar to the way other decisions are reached. To understand this process ". . . we need knowledge about the environments in which decision-makers work, about individuals and groups as decision-makers, and about the complexities of interpersonal and intergroup relations in decision-making" (Dill, 1964, p. 205).

One of the important tasks of those who would attempt to develop a theory of innovation is to determine which individuals, groups, and organizations are important in making decisions about the adoption of new practices. Following the identification of the important elements, it will be necessary to determine their inter-relationships. It should then be possible to determine the characteristics of the individual or group which influence their adoptive behavior.

Abbott (1964) presents a convincing argument to support the idea that the school as it now operates fits Weber's model for bureaucracies. One of the characteristics shared by schools and bureaucracies is their use of levels of graded authority to establish an ordered system of superordination and subordination. Abbott's thesis, like Griffiths', argues for the importance of the superintendent in decision-making, and thus in innovation. Griffiths (1964, p. 435) also proposes that the hierarchial order of the school system enables change to occur from the top down, but rarely from the bottom up.

New ideas are often introduced into an organization at points far removed from the locus of decision-making. Before a decision to adopt or reject the idea can be made it must reach the appropriate individual or group. In bureaucratic organizations there is a prescribed route which communication is expected to follow. In a public school setting the teacher is expected to bring the idea to the principal, the principal then may present it to the superintendent and finally, it may be carried by the superintendent to the board of education. The idea may be rejected at any point in the sequence. If this occurs the idea probably will not be passed on to the next level of decision-making. Thus a change may involve not one, but rather a sequence of decisions.

Persons occupying key positions in the formal bureaucratic structure of the organization and those in leadership roles in the informal organization are thought to be critical in the decision-making process. Brickell (1961) concluded that administrators introduced most new instructional innovations of major scope. He argues that administrative initiative is responsible for changes which involve rearrangement of the structural elements of the institution.

> In summary, authority is a critical element in the shaping of institutional decisions. Schools depend heavily upon administrative authority in decision-making. Consequently the control center of the institution, as schools are managed today, is the administrator. He may not be - and frequently is not - the original source of interest in a new type of program, but unless he gives it his attention and actively promotes its use, it will not come into being (Brickell, 1961, p. 24).

This study isolates two positions in the bureaucratic structure for investigation. These positions are the superintendency and the principalship.

The Superintendent and Innovation

While the superintendent does not have absolute power and is subject to numerous restraints, his importance in innovation seems to be assured by his role in the organization. Carlson (1964) supports this view by arguing that the superintendent is neither a victim of the local school budget nor a powerless subordinate of the board of education.

The extent to which the superintendent uses his authority and leadership depends upon his perception of the magnitude, importance, or sensitivity of the change. He will be most concerned about changes that a) involve a large portion of the staff, b) implicate the expenditure of large sums of money, c) are expected to be of concern to parents or lay persons in the community, d) necessitate coordination between buildings, or e) are expected to cause significant repercussions in the staff.

The studies of Mort and Cornell (1941) and Carlson (1962, 1964, 1965a) provide empirical support for the position that the superintendent is influential in the adoption of new practices. Mort and Cornell (1941, p. 385) identified the superintendent of schools as the chief adopting agent. In their Pennsylvania study nearly 90 per cent of the adoptions were accompanied by the active participation of the superintendent. In

55 per cent of the cases he had served as the active leader (Mort and Cornell, 1941). The critical role of the administrator was further supported by reports from teachers that the failure to adopt new practices was often a result of administrative opposition or incompetence.

Carlson (1962 and 1965a) supported the view that the superintendent is significant in innovation by demonstrating that varying rates of adoption relate to attributes of the superintendent. He found that varying rates in the adoption of innovations could be explained by characteristics of the district superintendent. Within the same geographical area, men who were the first to adopt modern math had a higher position in their peer social structure than did the late adopters.

The Principal and Innovation

A recent study of the relationship between attributes of the superintendent and innovation found that the correlation between secondary and elementary innovation was .19 (Reynolds, 1965). This low correlation suggests that innovation may be less a property of a district than of a school building. If this is the case; the principal, rather than the superintendent, may be the critical person.

An elementary or secondary school may be considered as a subsystem within a district. The principal's position as superordinate in the sub-system places him in a strategic position. He has the power to reward and punish subordinates who do not perform in the prescribed manner. Upward communication normally flows through the principal. This permits him to monitor the information and ideas received by higher-level administrators and thus to influence their decisions about change.

His power to veto the decisions of his subordinates allows him to effect the changes made by others within his building. This power is furthered by his control of scheduling and material resources.

The principal may also indirectly encourage innovation by promoting a climate that is acceptant of new practices. Halpin's (1965) work is based upon an implicit assumption that the group's perception of the leader contributes to the organizational climate. The principal may encourage staff members to suggest changes, form committees to study and propose changes, and make available and encourage use of new materials.

Several researchers have looked at the indirect influence of the principal. Chesler, Schmuck, and Lippitt found that "there is a high and significant correlation (+.65, p less than .05) between the amount of staff innovativeness as measured by the mean number of new practices developed by each teacher and the staff's perception of the principal's support for innovative teaching" (1963, p. 274). It was argued that the principal directly and indirectly influenced the interpersonal staff relations by encouraging or discouraging the sharing of educational ideas and insights. While this study argues that the principal is important in innovation, it should be noted that the innovations studied related to individual classrooms.

Goetz (1965), in a study of elementary school principals, demonstrated that variables related to the principal correlate significantly with the adoption of innovations. He found significant correlations between total innovativeness scores and the principal's attitude toward research and innovation (r = .18, p less than .01). He also found that principals innovated most frequently when the changes involved only their own buildings and did not require system-wide support and when the changes did not necessitate the outlay of additional funds (1965, p. 133)

Before concluding the discussion of the principal and innovation, note should be made of Griffiths' work. Griffiths used the data from the Development of Criteria of Success and School Administration Project (Hemphill, Griffiths, Frederiksen, 1962) to view the role of the elementary school principal in bringing about change in the school system (Griffiths, 1963). He found that principals innovated infrequently in a simulated administrative situation (Griffiths, 1963, p. 279).

Griffiths concludes

> . . . if we are to have change in school systems, we cannot look to the principal to initiate this change. The initiative for change must come from the top. Once a change is sanctioned by his superiors, the principal will work to effect that change at the building level (p. 284).

The fact that principals are not always directly involved in innovation is evident in the following statement which one principal attached to the questionnaire used in this study.

> There are principals and there are principals in name only. I fit the latter category. Therefore no serious consideration of change or adoption is necessary.

While the principal's influence in innovation is limited by the authority delegated to him by the superintendent, his position is potentially important. This study will attempt to determine the extent to which the principal's potential power is realized by investigating whether Reynolds' findings related to the superintendent can be extended to the principal. It will also consider whether the individual or the school system is the most appropriate unit of analysis in investigations of change.

Determinants of Administrative Behavior

The argument has been advanced that the superintendent and principal are important in making decisions about the adoption of new practices. Attention is now given to the identification of concepts which will help to explain why some administrators are associated with greater innovation than others.

Behavior of the administrator relative to decision-making is conditioned by the way he perceives the organization of which he is a part and the manner in which he views his role in that organization. Since the concern of this study is limited to a consideration of decisions which affect innovation, no attempt is made to identify concepts which will explain all of administrative behavior or all of decision-making. The concepts "perceived need for change" and "perceived power to innovate" were used by Reynolds (1965) to examine administrative behavior. They are thought to be useful in examining that aspect of decision-making which relates to the adoption of new practices.

Before an administrator makes an attempt to bring about change in the school district by adopting new practices, he must feel that there is a need for change and that there is the possibility that the change can be effectively made. Perceived need for change and perceived power to innovate may therefore be considered necessary, but not sufficient, conditions for the occurrence of innovation.

Perceived Need for Change

Perceived need for change refers to an individual's satisfaction or dissatisfaction with the goals, procedures, or outcomes of an organization. Abbott's discussion lends support to the idea that dissatisfaction is a prerequisite for the adoption of new practices. He indicates that innovation is an adaptive response for an organization when a program of action ceases to be satisfying (Abbott, 1964, p. 3).

The administrator's perceived need for change is thought to be influenced by: a) his definition of his own role, b) his perception of the existing program, c) his knowledge of alternatives, d) his commitment to the existing program, and e) his integration into the social system.

Lipham (1964) discusses two aspects of the role perceptions of superintendents. He distinguishes between the leadership and administrative functions as follows:

> The leader is concerned with initiating changes in established structures, procedures, or goals; he is disruptive of the existing state of affairs . . .
>
> The administrator is concerned primarily with maintaining, rather than changing established structures, procedures, or goals. Thus, the administrator may be viewed as a stabilizing force (Lipham, p. 122).

Chesler, Schmuck, and Lippitt (1963) have suggested a similar dichotomy for the role of the principal.

> Principals with the innovative staffs are more 'professionally' oriented than those with less innovative staffs. The former are concerned with improving classroom processes, encouraging teacher growth, and continually evaluating pupil learning. The latter group on the other hand, tend to be more 'administratively' oriented. They are concerned primarily with achieving a smoothly running organization, and are very responsive to the demands of their administrative superiors (p. 275).

The preceding discussion suggests that administrators who place emphasis upon the leadership (or professional) role will be more concerned with the adoption of new practices than those who emphasize the administrative aspects of their job. They are expected to have a higher perceived need for change.

The administrator's perception of the existing program depends upon both the objective characteristics of the program and the accuracy of the information he has about it. The information the administrator receives is subject to distortion. The predominate pattern of communication is from the top down (Griffiths, 1964). When upward communication does occur it is altered to avoid negative reflections upon lower bureaucratic members (Blau and Scott, 1962). Therefore, the administrator often has a more favorable picture than is justified by actual conditions. This tends to lower his perception of the need for change.

Knowledge of an innovation may precede or follow a perceived need for change. When dissatisfaction with current goals, procedures, or outcomes exists members of the organization may actively seek alternatives. This is most likely to occur when changing conditions present new problems. Dissatisfaction may also occur as a result of systematic evaluation.

Knowledge of new practices does not always come as a result of search behavior induced by a perceived need for change. Knowledge of a new practice gained through conversations with others, reading, convention attendance, etc. may serve to induce dissatisfaction with present programs.

Since most changes that occur in a system do not involve inventions originating within the system, but rather adoptions or adaptations of practices originating outside the system, the administrator's knowledge of alternatives to present practices depends in large part upon the extent of his contacts outside his immediate environment. Those who have the broadest knowledge of alternatives are expected to perceive a greater need for change.

Carlson (1965a) has demonstrated that there is a significant relationship between innovation and the superintendent's position in the social structure of superintendents. One explanation is that more extensive contact increases information about other alternatives. It may also be that innovation enhances the superintendent's status with his peers.

Perceived need for change is inversely related to commitment to the existing program. The superintendent who has been involved in the development of a program is expected to view it in a more favorable light. Involvement increases the psychological investment of the individual. Abbott (1964) attributes much of the inertia in formal organizations to the "sunk costs" of the organization.

> . . . in the educational enterprise, these 'sunk costs' consist of a substantial investment in training and experience, and of a psychological commitment to particular ways of programming activities (Abbott, 1964, p. 3).

Commitment to a program may also result from loyalty to an individual who initiated it. The followers of a leader, particularly one with charismatic qualities, are often reluctant to make even the smallest change in their programs. Alteration is tantamount to disloyalty.

Perceived need for change relates inversely to integration into the social system. The individual who has achieved a high degree of integration tends to protect favored relationships by maintaining the status-quo. Change is resisted because it is frequently accompanied by alterations in patterns of interaction and role definition.

Perceived Power to Innovate

Perceived power to innovate refers to an individual's estimate of his ability to influence the goals, procedures, or outcomes of an organization. The administrator can; by virtue of his position, training and experience; influence decision-making. He does not, however, have absolute power. The power of other individuals in the organization and the characteristics of the organization itself may be sufficient to limit the influence of any one individual (Katz and Kahn, 1966). The board of education, other administrators, community pressure, and staff resistance may serve as restraints upon the administrator's range of control.

The major determinants of perceived power to innovate are the administrator's perception of: a) the external climate for change, b) the internal climate for change, and c) his own influence and power. Thus, perceived power to innovate depends upon both factors associated with the administrator and factors related to the situation in which he finds himself.

The administrator and the social system of which he is a part do not operate in a vacuum. The interaction between the school and the community must be maintained at a favorable level in order to maximize the efficiency of school operations. The public school has been classified as a "domesticated organization;" whose existance is guaranteed (Carlson, 1965, p. 6). However, the degree to which the school operates above the level guaranteed by law depends upon the community's approval of the school's operation. It is felt that innovations have the potential to modify the desired level of community approval.

The extent to which community members become involved in a decision to adopt a new practice, depends upon their awareness of the change and the magnitude and sensitivity of the change. The community's awareness of an innovation depends upon its visibility. Bus routes and schedules, homework, the school calendar, and grading and reporting practices are among the highly visible aspects of the school program. These aspects represent areas in which parents are directly involved and they therefore feel they have a legitimate right to participate in decision-making.

Innovations which touch upon the values of individuals or the norms of the community will arouse greater community interest because of their sensitivity. Examples of sensitive areas include sex education, controversial issues in social studies, religious issues, and integration.

Community members react not only to the specific innovation under consideration, but also to the related changes that may be involved. The community may react negatively to desired changes which involve increases in the tax rate, changes in racial composition of the school, or other focal concerns. When the opposition stems from related changes, there may be little relationship between the acutal basis for opposition and the reasons publicly stated.

When a community favors or opposes a particular type of change, it can bring considerable pressure to bear upon the organization. The power of the community is built into the system of school support that makes the approval of bond issues for building purposes and tax levies for operational expenditures dependent upon the approval of the voters of the district. It is not surprising that administrators tend to make only those changes that are likely to be acceptable to the public. The way this serves to limit the administrator's freedom of action has been expressed by Callahan (1962) in his "vunerability thesis."

A community may bring pressure to bear upon the administration through the board of education. Board members, as elected representatives of the community, are obligated to be responsive to their constituents. When they fail to be responsive they risk their positions. It may be observed that board members are reluctant to give up the prestige and power associated with their positions.

The board's ability to invoke sanctions of consequence gives a powerful means of control. Brickell (1961) emphasizes the power of the board and the community as follows:

> Parents, citizens groups and the board of education seldom exert a direct influence; however, their influence is decisive when exerted (p.20-21) (italics mine).

The power of the board of education and the community may be seen as affecting the superintendent's actual and perceived power to innovate.

Other aspects of the environment influence the superintendent's power to innovate. They may increase or decrease his power. State and federal government programs may set minimum standards for receiving financial aid, national and local critics of education may influence the climate for change, special interest groups may attempt to use the schools as a means of accomplishing their goals, and curriculum groups may arouse interest in new programs.

The administrator's perceived power to innovate is influenced by the internal climate for change. When the members of an organization are satisfied with the existing program; that is, have a low perceived need for change, they tend to resist attempts to alter the status quo. This resistance limits the administrator's actual and perceived power to innovate. Resistance is usually directed toward administrators who are held responsible for the innovative attempt and its consequences.

The principal is particularly vunerable because he is the most accessible representative of the authority structure. Thus he becomes the target of the resistance techniques available to the lower participants. (See Becker, 1961; Mechanic, 1964).

When the changes that are likely to result from the adoption of a particular innovation are perceived as being consistent with existing values and interaction patterns, there may be little or no resistance to the change. When, on the other hand, the innovation presents a threat to the maintenance of desired interpersonal relationships by altering the role definition of members or challenges existing attitudes and values, the resistance may be great. Because subordinates are frequently the agents who must implement the change, their resistance is likely to endanger the success of the change attempt.

The members of a social system may react not only to the content of the innovation but also to the decision-making process used in selecting it. They are more likely to accept the change if it was advocated by an individual of high prestige. Persons also tend to view change more favorably when they have been involved in the decision-making process (Coch and French, 1948).

Innovations often have a different effect upon the members of a social system. This may be expected to create pressures for change and counter pressures for stability. The magnitude and direction of these forces influence the administrator's perceived power to innovate. While resistance to change is a frequent condition, it is also possible to find indifference or pressure for change.

The administrator who advocates change stands to gain or lose influence and prestige. An unsuccessful influence attempt diminishes his status and thus his ability to determine the future course of events in the organization. On the other hand, successful influence attempts add to the status and power of the administrator.

An administrator's perception of his power to innovate is conditioned by the anticipated reaction of higher levels of authority. There is always the danger that his decision will be vetoed at a higher level. Because his future power is determined by his present successes and failures, innovation will seldom be proposed when the administrator anticipates rejection by a superordinate. To do so is to jeopardize his status and future power. The extent to which this influences the behavior of an individual may be related to his risk taking. Some men are more willing to gamble than others.

Joint Consideration of Perceived Need for Change and Perceived Power to Innovate

It has been argued that administrators are important in innovation and that perceived need for change and perceived power to innovate are useful concepts in examining administrative behavior related to innovation. Perceived need for change and perceived power to innovate are each considered to be necessary but not sufficient conditions for the occurrence of innovation.

If administrators are categorized as having either a high or low perceived need for change and a high or low perceived power to innovate, each administrator may be categorized as a member of one of four groups. Table 1 identifies these groups.

Since both perceived need for change and perceived power to innovate are necessary for innovation, groups 1, 2 and 3 will have low innovation rates and group 4 will have a high innovation rate.

TABLE 1

ADMINISTRATORS CATEGORIZED BY PERCEIVED NEED FOR CHANGE AND PERCEIVED POWER TO INNOVATE

Group Number	Category	Expected Level of Innovation
1	Low Perceived Need for Change Low Perceived Power to Innovate	Low
2	Low Perceived Need for Change High Perceived Power to Innovate	Low
3	High Perceived Need for Change Low Perceived Power to Innovate	Low
4	High Perceived Need for Change High Perceived Power to Innovate	High

Determinants of Perceived Need for Change and Perceived Power to Innovate

Consideration is now given to the identification of three variables that relate to perceived need for change and perceived power to innovate. The administrator's perceived need for change and perceived power to innovate are conditioned by the manner in which he perceives the organization and the way that he relates to it. The administrator's tenure, succession pattern, and reference group orientation affect these perceptions and relationships.

Tenure

Tenure refers to the length of time that an administrator has occupied his present position. (It does not refer to the length of time in a school system.) The administrator of long tenure is expected to see less need for change than the administrator of short tenure because he has often played an important part in the formulation of the existing program and may therefore have a greater commitment to it. His involvment in the interpersonal structure and his loyalty to the school system and its traditions are also expected to be greater and thus to further diminish his perception of the need for change.

Bridges (1964) found that older, more experienced principals involved their teachers in a higher degree of participation in decision-making than younger, less experienced principals. If a chief concern of teachers is stability, then Bridges' observation may help to explain the maintenance of present programs.

> Their participative behavior may reflect the older, experienced principals' desire to maintain a stable situation through increasing the teacher's voice in matters of central concern to the teacher (Bridges, 1964, p. 3).

While numerous studies have been made of tenure, few have focused upon the relationship between tenure and change. Two studies (Todd, 1963; Carlson, 1961) do, however, provide evidence concerning the relationship between the tenure of the superintendent and the amount of change in a school system. In the first of these, Todd examined the tenure of "agents of change" and "agents of resistance" (Todd, 1963). The former category included superintendents of districts that ranked in the upper quarter of a distribution related to the amount of change according to an index of financial support for the school program. "Agents of resistance" were those superintendents whose districts ranked in the lowest quartile.

"Agents of change" were found to have shorter administrative tenure (6.76 years) than "agents of resistance" (14.21 years) (Todd, 1963, p. 90-91). The "agents of change" were also found to be younger and to have fewer years of professional experience (Todd, 1963, p. 109).

While the hypothesis of the present study and Todd's hypothesis were similar in that both predicted a negative relationship between tenure and change, the reasoning differed. Todd considered shorter tenure to result from having introduced change (Todd, 1963, p. iiii), while the present study reversed the cause-effect relationship. The fact that the superintendent is new to the position was expected to affect his attempts to introduce change. Intervening variables introduced in the present study provide useful information for dealing with the question of causality.

While Carlson's investigation focused upon the importance of succession pattern, tenure was considered indirectly. It was hypothesized that "during the early stages of the succession cycle, outside successors will add more positions to the central office administrative staff than will 'old' superintendents in comparable districts during the same time span, and vise versa for insiders" (Carlson, 1961, p. 219). The 11 districts with new insiders added 5 positions or an average of .45 positions per district. The "old" superintendents in 11 comparable districts added 14 positions or an average of 1.27 positions per district. Twenty districts with new outsiders added 39 positions, an average of 1.9 positions per district, while the 20 matched districts with "old" superintendents added 25 positions, or an average of 1.25 positions per district (Carlson, p. 219). These findings supported the hypotheses.

Reynolds (1965, p. 20) performed a secondary analysis of Carlson's data by combining the inside and outside successors into a single category, "new superintendents," and comparing the amount of change in these districts with the amount of change in systems headed by "old superintendents." The tenure of the "old superintendents," of course, was greater than that of "new superintendents." The 31 "new superintendents" added 44 positions and the 31 "old superintendents" added 39 positions. While the relationship was in the predicted direction, the difference was not statistically significant.

The variation in the findings of Todd and Carlson could relate to the nature of their samples, differences in the time period studied, the nature of the statistical analyses, or the operational definition of change. In any event, the results argue strongly for further investigation of the relationship between the tenure of the superintendent and innovation.

Goetz (1965), in a study of 203 elementary schools in 74 Michigan school districts, examined the relationship between 13 situational and personal variables relating to the elementary principal and building innovation. He found that the principal's administrative experience in the present building correlated negatively (-.35) with innovation in instruction. Total administrative experience as a principal was also found to be negatively correlated (-.29) with innovation. Both findings were significant at the .01 level.

Succession Pattern

Succession pattern refers to whether the individual comes to his position from inside or outside the school system. The outside successor may at least during the early stages of the succession cycle see a greater need for change because, like the administrator of short tenure, he will not have played a significant part in the development of the program of the school system. The outsider's knowledge of the program in another district provides him with a basis of comparison. A belief in the program of his former district may result in a desire to implement that program in his present district. He will also have little involvement in the interpersonal structure. The outsider may not only have little commitment to the traditions but may even lack knowledge of them.

The outsider is expected to have during the first few years of his tenure, a greater sense of power to innovate than the insider. Carlson said that there are different conditions of employment and differential expectations for insiders and outsiders (Carlson, 1961, p. 226). The insider is hired with the understanding that he will keep things as they are, while the outsider may be expected to make changes. The difference in expectations arises from differential satisfactions with the previous administration; i.e., when the board is satisfied it may employ either an insider or an outsider, but when it is dissatisfied it will turn to an outsider.

Carlson (1962) found that superintendents promoted from within and those employed from outside relate to the organization in different ways. This difference is due in part to differences in the extent to which the person considers place of employment more important than career as superintendent. Those in the first group remain in the school system and wait for promotion, while those in the second category leave the system for a superintendency elsewhere.

Carlson also indicated that the insider is likely to be unwilling or unable to make changes because of his integration in the internal and external interpersonal structure. The findings of the investigation support the theoretical positions advanced. Outside successors tended to expend greater effort in making new rules and policies, while inside successors were more concerned with publicizing and reinforcing existing rules.

Reference Group Orientation

Reference group orientation refers to an individual's identification with the local and larger social structure. Administrators whose primary identification is external to the local school system are "cosmopolitans." Those whose identification is internal to the school system are "locals." The administrator who has a cosmopolitan reference group orientation is expected to see a greater need for change because of an increased awareness of alternatives to the existing program. This is expected to occur as a result of greater interest in events outside the local school system. Cosmopolitans come into earlier contact with ideas as a result of more extensive reading and more frequent personal contact with persons external to the local system.

Because the cosmopolitan is more concerned with a reference group outside his immediate environment, he may have less local involvement and therefore be less concerned about keeping things "as they are." The cosmopolitan may seek an increase in status within the profession through the visibility acquired by the initiation of "new" programs. Persons outside the local district will be more impressed by the initiation of new programs than by the effective administration of the existing program.

The concepts cosmopolitan and local orientation were developed by Merton to explain the pattern of influence in the community of "Rovere." The classification of persons as locals and cosmopolitans was made in terms of their orientation toward local and larger social structures.

> The chief criterion for distinguishing the two is found in their orientation toward Rovere. The localite largely confines his interests to this community. Rovere is essentially his world. Devoting little thought or energy to the Great Society, he is preoccupied with local problems, to the virtual exclusion of the national and international scene. He is, strictly speaking, parochial.
>
> Contrariwise with the cosmopolitan type. He has some interest in Rovere and must of course maintain a minimum of relations within the community since he, too, exerts influence there. But he is also oriented significantly to the world outside Rovere, and regards himself as an integral part of that world. He resides in Rovere but lives in the Great Society. If the local type is parochial, the cosmopolitan is ecumenical (Merton, 1957, p. 393).

Local and cosmopolitan orientation were also used by Gouldner in his investigation of latent social identities (Gouldner, 1957). In an extensive study of a college faculty he found the concepts useful in organization analysis. Cosmopolitans and locals differed in degree of influence, participation, and rule tropism, as well as in patterns of informal social relations, in the organization studied.

Sutthoff (1960) found that the cosmopolitan and local orientation of lay persons helped explain differences in the form and degree of their participation in school affairs as measured by three of six dimensions of participation. The three significant dimensions were activity in organizational affairs, communicated interest in school affairs, and loyalty to the organization. No significant relationship was found with compliance to organizational policy, knowledge of organizational policy, or pride in the local schools (Sutthoff, 1960). Brumbaugh adapted the Local-Cosmopolitan Index developed by Sutthoff to public school teachers but failed to find an expected difference between the attributes of locals and cosmopolitans with regard to district reorganization (Brumbaugh, 1963).

The Model

The model which follows is less inclusive than the rationale. It isolates selected concepts associated with the superintendent and principal for investigation. Tenure, succession, and reference group orientation constitute the independent variables. Innovation serves as the dependent variable.

The major hypotheses are:

1. The rate of innovation in an organization is inversely related to the tenure of the administrator.
2. The rate of innovation in an organization will be greater if the successor to the administrator is from outside the organization than if he is from inside the organization.
3. The rate of innovation will be greater if the administrator has a "cosmopolitan orientation" than if he has a "local orientation."

Perceived need for change and perceived power to innovate are treated as intervening variables used to explain the relationship between the independent variables (tenure, succession pattern, and orientation) and the dependent variable (innovation). The relationships between the intervening variables and the independent and dependent variables formed the minor hypotheses which follow:

a. The administrator's perceived need for change will be inversely related to his tenure.

b. The administrator's perceived need for change will be greater if he succeeded to his position from outside the organization than if he was promoted from within the organization.

c. The administrator's perceived need for change will be greater if he has a cosmopolitan orientation than if he has a local orientation.

d. The administrator's perceived power to innovate will be greater if he succeeded to his position from outside the organization than if he was promoted from within the organization.

e. The level of innovation is expected to be greater when the administrator has a high perceived need for change and a high perceived power to innovate than when the administrator has either a low perceived need for change or a low perceived power to innovate, or both.

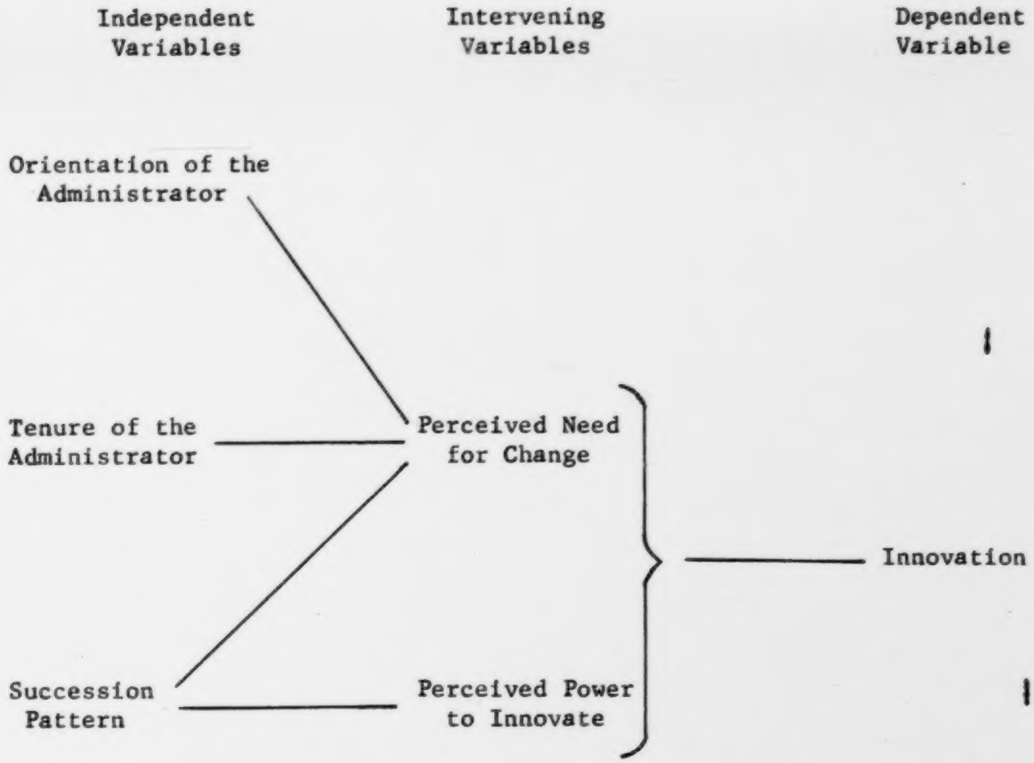

Independent Variables
Intervening Variables
Dependent Variable
Orientation of the Administrator
Tenure of the Administrator
Succession Pattern
Perceived Need for Change
Perceived Power to Innovate
Innovation

Figure 1

RELATIONSHIPS PREDICTED IN THE MINOR HYPOTHESES

CHAPTER III

METHODOLOGY

This study utilizes data collected in the senior author's earlier investigation of the superintendent and innovation (Reynolds, 1965). Questionnaires were sent to superintendents and principals in 183 Missouri and Illinois school districts. The districts included in the sample provided both elementary and secondary education and were accredited by the North Central Association of Colleges and Secondary Schools. Accreditation was used as a criterion to avoid extreme differences in size and expenditure level.

Questionnaires were sent to superintendents and principals in 79 Missouri and 104 Illinois districts in April of 1965. Replies were received from 444, or 81 per cent of the 549 superintendents and principals. Table 2 shows the returns by sub-group.

TABLE 2

QUESTIONNAIRE RETURNS CATEGORIZED BY POSITION OF RECIPIENT

	Number sent	Number Returned	Per cent Returned
Superintendent	183	147	80.3
Secondary Principal	183	159	86.9
Elementary Principal	183	138	75.4
All groups	549	444	80.9

The questionnaire sent to the principals and the superintendents were identical with respect to information concerning tenure, succession pattern, and reference group orientation. The superintendents' questionnaire included questions to obtain information about the size and expenditure level of the district. The principals' questionnaire included questions relating to the measure of the dependent variable, innovation.

The Independent Variables

Tenure

Tenure was determined by the principal's or superintendent's report of the number of years he had served in his present position including the present year as one. Since innovation was considered for a period of years rather than for a single year, it was necessary to convert the tenure scores to an average for the innovation period. The average tenure (T_a) was calculated by the formula:

$$T_a = \frac{T_n + T_{n-1} + T_{n-2} + T_{n-3}}{x}$$

where T_n = tenure in 1964-65 if tenure ≥ 2
T_{n-1} = tenure in 1963-64 if tenure ≥ 2
T_{n-2} = tenure in 1962-63 if tenure ≥ 2
T_{n-3} = tenure in 1961-62 if tenure ≥ 2
x = the number of tenure scores appearing in the numerator

The statistical procedures used in this study include simple, multiple, and partial correlation and analysis of covariance. The average tenure scores were dichotomized when the analysis of covariance was used. When the average tenure score was 5.5 years or less the principals and superintendents were assigned to a category called "short tenure." When the average tenure score was greater than 5.5, the assignment was to a category called "long tenure." Dichotomization was used because the effect of tenure upon innovation was not expected to be linear. It was anticipated that the administrator of short tenure would relate to the organization in a manner different from the administrator of long tenure. However, the effect was expected to diminish such that after the early years (operationalized as 5.0 years) little difference would be expected from year to year.

Succession

The principal and superintendent were asked to indicate the position and school district of his employment immediately prior to assuming his present position. This provided the information needed to categorize both the principal and superintendent as either an "inside successor" or an "outside successor."

Local-Cosmopolitan Orientation

Nine items designed to measure local-cosmopolitan orientation were included in the questionnaire sent to principals and superintendents. The first three items are adaptations from the Index of Local-Cosmopolitan Orientation developed by Sutthoff (1960) and later used by Brumbaugh (1963). The nine items pertained to such things as convention attendance, reading habits, sources of information about new practices, and relative concern about local and national issues in education.

The earlier study of the superintendent (Reynolds, 1965), utilized a principal axis factor analysis and an oblique rotation to develop a seven item scale for local-cosmopolitan reference group orientation of superintendents. Normalized factor scores for each superintendent were obtained from the rotated factor loadings.

Identical procedures were used to determine whether separate analyses of the elementary and secondary principals' responses would yield factor structures similar to those obtained for the superintendent. It was found that the original structure was not reproduced. This finding led to the conclusion that local-cosmopolitan orientation as operationalized is not unidimensional, and therefore that it can be better measured by a cumulative scale.

The scale used in the analysis was composed of 8 items (numbers 1, 3, 4, 5, 6, 7, 8, 9). Item two was omitted because it was either not answered by a large number of respondents or a qualification was added to the response. Each of the remaining eight items was dichotomized to form two groups which were as nearly equal as possible.

Scores for each superintendent and principal were determined by counting the number of times he responded to an item in a cosmopolitan fashion. The scores obtained ranged from zero (no items answered in a cosmopolitan manner) to eight (all items answered in a cosmopolitan manner). Table 3 shows the distribution of scores for each of the three groups of respondents, superintendents, elementary principals, and secondary principals.

When the analysis of covariance was used the local-cosmopolitan scores were dichotomized. Principals and superintendents with scores of 3 or less were considered as local, scores of 4 or more were placed in the cosmopolitan category.

TABLE 3

DISTRIBUTION OF LOCAL-COSMOPOLITAN SCORES

	Local				Cosmopolitan				
	0	1	2	3	4	5	6	7	8
Superintendent	6	11	11	25	15	14	8	3	1
Elementary Principal	12	18	36	21	12	8	1	2	0
Secondary Principal	6	14	17	21	16	19	12	4	1
Total	24	43	64	67	43	41	21	9	2

The Intervening Variables

The intervening variables discussed below are used in the superintendent's analysis but not in the elementary and secondary principals' analyses or in the joint analysis. The "perceived need for change" was measured by asking the superintendent to indicate the amount of change (extensive, moderate, minor, or no change) that he considered desirable in relation to each of 12 specific areas. The directions asked that financial limitations and possible resistance from the board, staff, or community, be ignored. The items were as follows:

1. Elementary curriculum content and materials
2. Secondary curriculum content and materials
3. Education technology (programmed instruction, educational TV, language laboratories, etc.)
4. Physical facilities
5. Patterns of time use ("year around" schools, flexible scheduling, etc.)
6. Teacher role definition (team teaching, teacher aides, etc.)
7. Classroom composition (large group instruction, ungraded primary, etc.)
8. Supplementary services (transportation, adult education, etc.)
9. Structural changes in the pattern of administrative organization
10. Procedures for evaluating the educational program
11. Teacher selection and induction procedures
12. In-service educational programs

The items for measuring the "perceived power to innovate" related to the amount of difficulty (great, considerable, minor, and no difficulty) that the superintendent felt he would have in getting a series of changes adopted. The introductory statement and the 9 items are as follows:

> The superintendent can; by virtue of his position training, and experience; influence the decisions that are made in his district. The superintendent, however, does not have absolute power in his district. The board of education, community pressure, and staff resistance may limit his range of control. In view of these factors, how much difficulty would you have in getting each of the following adopted? Assume you considered them desirable practices.
>
> 1. A 5% increase in the local tax rate
> 2. A 15% increase in the local tax rate
> 3. A major change in teacher role definition (team teaching, teacher aides, etc.)
> 4. A major curriculum change
> 5. A change in educational technology (Programmed instruction, educational TV, etc.)
> 6. A major improvement in physical facilities
> 7. A significant change in teacher selection and induction procedures
> 8. A new pattern of time use (year around school, flexible scheduling, etc.)
> 9. A change in pupil assignment patterns (large group instruction, ungraded primary, etc.)

The items for measuring "perceived need for change" and the items designed to measure "perceived power to innovate" were analyzed by a single factor analysis. If the items from the two scales loaded highly on separate factors, it would be possible to conclude that they were measuring two separate domains. Further, if each item designed to measure "perceived need for change" had a high loading on a single factor it could be concluded that each item was contributing to a common scale. A similar interpretation could be made if the items pertaining to "perceived power to innovate" loaded on a single factor.

A factor analysis was performed of the 21 x 21 correlation matrix formed by the intercorrelations of the raw scores of the 150 superintendents on the 21 items. The principal axis factor analysis yielded 6 factors with eigenvalues greater than one. These factors had a cumulative eigenvalue of 12.33 and accounted for 59 per cent of the total variance.

Rotation to a factorially invariant solution was performed using oblimax criterion, and rotations for 2, 3, 4 and 6 factors were compared. The 2 factor oblique solution was chosen as the preferred factorial description of the correlation matrix. The reasons for this were as follows:

1) While 6 factors with eigenvalues greater than one were extracted by the principal axis method, 57 per cent of the variance explained by the 6 factors was attributed to factors 1 and 2.

2) The incremental portion of the variance explained by each successive factor showed a large decrease after the second factor. This was the largest change between any two successive factors.

3) A comparison of the distribution of factor loadings for 2, 3, 4 and 6 factors indicated that the items divide in a "cleaner" fashion on the two-factor solution, i.e., an item high on factor one was low on factor two, and vice versa.

The loadings of the 21 items on the two factor oblique rotation are given in Table 4. The principal axis factors are given in Appendix B.

TABLE 4

ROTATED ITEM FACTOR MATRIX FOR THE 21 ITEMS FROM THE "PERCEIVED NEED FOR CHANGE" AND "PERCEIVED POWER TO INNOVATE" SCALES

(N = 150)

Original Item Number	Factor I	Factor II	h^2
10f	70	12	47
g	68	17	50
e	62	07	38
l	54	-08	25
j	54	-05	31
h	53	04	29
c	53	-05	29
b	52	17	30
i	51	03	27
k	50	-06	28
a	49	03	25
d	23	-09	08
11c	05	81	67
e	14	77	61
i	14	74	54
g	03	60	36
d	-05	54	32
h	13	51	27
b	-24	35	17
a	-24	35	17
f	-13	34	14
Eigenvalue[a]	3.80	3.10	

[a] Computed from the original unrotated factors.

The Dependent Variable

The measures of secondary and elementary innovation were derived from information provided by the questionnaires sent to the principals. The principals were asked to report the adoption status of 19 elementary and 23 secondary innovations selected from practices being diffused through schools such as those in Missouri and Illinois. In order to obtain variability in the scores on the dependent variable, an attempt was made to include both innovations which most schools were thought to have adopted and innovations which only a few schools would have adopted.

Each principal was asked to indicate whether or not each innovation had been adopted in his building, and if so, the year in which it had become a part of the regular school program. Innovations adopted before the 1961-62 school year were reported in a single category, "before the 1961-62 school year," on the grounds that the precise time of introduction could not be accurately reported for more than four years in the past. The other response categories were: in 1961-62, 1962-63, 1963-64, 1964-65, and not adopted. Copies of the questionnaire sent to principals are included in Appendix A.

Table 5 presents a list of the elementary innovations and reports the number of districts adopting a given practice in each of the time periods. Secondary innovations are shown in a similar manner in Table 6.

Eleven of the original 41 items, 5 elementary and 6 secondary, were eliminated from the final analysis because of the small variance in the response to these items. The items that were eliminated are preceded by an asterisk in Tables 5 and 6.

TABLE 5

THE NUMBER OF DISTRICTS ADOPTING 19 ELEMENTARY INNOVATIONS DURING EACH OF 5 TIME PERIODS

(N = 138)

Innovation	Before 1960	1961-1962	1962-1963	1963-1964	1964-1965	Total Adopted by 1965
* Music Teacher	121	2	3	2	4	132
Modern Math	8	12	16	41	33	110
Physical Education Teacher	71	4	7	8	5	95
Art Teacher	75	8	4	3	3	93
Overhead Projectors	13	3	10	25	40	91
Departmentalization	40	4	6	11	7	69
Photocopy Machine	5	1	4	11	28	49
Elementary Guidance	17	3	8	11	7	46
Duty Free lunch periods	26	2	3	4	6	41
Programmed Instruction	6	3	11	14	4	38
Foreign Language	20	6	2	6	2	36
Ungraded Primary	11	2	4	0	6	23
Team Teaching	5	6	1	6	12	30
Large Group Instruction	10	2	3	1	11	28
Teacher Aides	5	2	2	1	7	17
* Merit Pay	6	1	2	1	1	11
* Test Admission to kindergarten	3	1	0	1	0	5
I.B.M. Grade Reporting	1	0	1	0	2	4
* Closed Circuit Television	0	1	0	2	0	3

---

*The asterisk indicates items omitted from the final analysis because of their low variance.

TABLE 6

THE NUMBER OF DISTRICTS ADOPTING 23 SECONDARY INNOVATIONS DURING EACH OF 5 TIME PERIODS

(N = 159)

Innovation	Before 1960	1961-1962	1962-1963	1963-1964	1964-1965	Total Adopted by 1965
* Counseling	127	15	5	5	4	156
* Free Period	153	0	1	0	1	155
* Driver Education	139	5	2	2	3	151
Overhead Projectors	49	17	31	27	20	144
Grouping	106	14	11	4	7	142
Photocopy Machine	48	25	26	21	16	136
Modern Mathematics	27	15	40	23	22	128
Language Laboratories	35	13	26	18	17	109
Remedial Reading	52	13	11	12	13	101
New Science Programs	21	18	16	18	24	97
Summer School	56	5	14	7	3	85
Programmed Instruction	5	7	23	15	10	60
Team Teaching	8	8	16	7	13	52
Algebra in Grade Eight	21	9	10	3	7	50
Large Group Instruction	10	4	16	7	8	45
Teacher Aides	7	7	6	7	7	34
I.B.M. Grade Reporting	9	4	5	0	16	34
Structural Linguistics	1	3	5	9	14	32
I.B.M. Scheduling	7	6	3	2	10	28
Russian	11	5	2	1	2	21
* Merit Pay	9	3	0	1	1	14
* Modular Scheduling	1	1	2	2	2	8
* Closed Circuit Television	2	0	1	1	3	7

---

*The asterisk indicates items omitted from the final analysis because of their low variance.

The measure of innovativeness of secondary and elementary schools was determined by dividing the number of innovations by the number of innovations possible and multiplying by 1000 to eliminate the decimal. This measure is called "the innovation-ratio." The use of the number of innovations per year was ruled out because this procedure penalized a school which had made a large number of innovations prior to the four year period investigated. The ratio was felt to remove any bias against previously innovative schools near the "ceiling" of the measure.

In order to match the procedure used to determine the average tenure of the principal (see page 34) the innovation-ratio (IR) was computed by the formula:

$$IR = \frac{I_n + I_{n-1} + I_{n-2} + I_{n-3}}{P_n + P_{n-1} + P_{n-2} + P_{n-3}}$$

where I_n = the number of innovations adopted in 1964-65, and tenure 2.

I_{n-1} = the number of innovations adopted in 1963-64, and tenure 2.

I_{n-2} = the number of innovations adopted in 1962-63, and tenure 2.

I_{n-3} = the number of innovations adopted in 1961-62, and tenure 2.

P_n = the number of innovations that had not been adopted prior to 1964-65, and tenure 2.

P_{n-1} = the number of innovations that had not been adopted prior to 1963-64, and tenure 2.

P_{n-2} = the number of innovations that had not been adopted prior to 1962-63, and tenure 2.

P_{n-3} = the number of innovations that had not been adopted prior to 1961-62, and tenure 2.

The secondary innovation scores have a range of .000 to .500, a mean of .126, and a standard deviation of .086. The elementary innovation scores have a range of .000 to .429, a mean of .105, and a standard deviation of .095.

Control Variables

In order to assess the true relationship between the independent and dependent variables it was considered necessary to introduce two variables, expenditure per pupil and district size, as controls. Previous research has suggested, with some exceptions, that low expenditure level and small size decrease the extent of innovation in a district. Expenditure per pupil was included as an item in the superintendent's questionnaire. The superintendent was also asked to report the number of teachers and the pupil enrollment of the district. The number of teachers was chosen as the measure of district size because it was thought that most problems related to innovation are more closely associated with the size of the staff than with the number of pupils in the district. It would be more difficult to introduce modern mathematics to 90 pupils taught by three different teachers than it would if they were taught by a single teacher. The choice between staff size and number of pupils is of little consequence since the two variables correlate .98.

Statistical Analysis

The choice of statistical techniques was based upon a desire to determine the amount of variance in innovation that could be accounted for by each of the independent variables, exclusive of the effect of any correlation between the independent variables. A technique was needed which would also permit the introduction of statistical controls for the difference in innovation scores due to differences in district size and expenditure level. Both the analysis of covariance and the more general multiple regression analysis were appropriate for making the desired tests.

The more widely used procedures, analysis of variance and analysis of covariance, are special cases of multiple linear regression (Bottenberg and Ward, 1963). Whiteside and Jennings (1963) have demonstrated that the results obtained by the analysis of variance and multiple linear regression are identical. The regression model was chosen because of its greater flexibility and because the available computer program permitted the use of unequal cell entries.

The analysis utilized the General Linear Hypothesis Program written by McKinney and Shumate, October 1, 1963, and made available through the Washington University Computation Center, which is supported by National Science Foundation Grant G-22296.

A 2 x 2 x 2 analysis of covariance design was used in which the two control variables served as covariates. Covariance had the advantages of utilizing a more familiar form for reporting the results and providing information about both "main effects" and "interactions."

In summary, the tenure of the administrator was designated as Factor A and the two levels (short tenure and long tenure) as A_1 and A_2, the succession pattern as Factor B and the two levels (inside and outside) as B_1 and B_2, and the orientation as Factor C with the two levels (local and cosmopolitan) as C_1 and C_2. The eight treatments were represented as follows:

Treatment	Tenure	Succession	Orientation
$A_1B_1C_1$	Short	Inside	Local
$A_1B_1C_2$	Short	Inside	Cosmopolitan
$A_1B_2C_1$	Short	Outside	Local
$A_1B_2C_2$	Short	Outside	Cosmopolitan
$A_2B_1C_1$	Long	Inside	Local
$A_2B_1C_2$	Long	Inside	Cosmopolitan
$A_2B_2C_1$	Long	Outside	Local
$A_2B_2C_2$	Long	Outside	Cosmopolitan

Table 7 shows the number of cases assigned to each of the eight cells for the elementary, secondary and superintendent's analyses. The elementary and secondary analyses include 110 and 109 principals respectively. Ninety-four cases were included in the superintendent's analysis.

TABLE 7

THE DISTRIBUTION OF CASES AMONG TREATMENT CONDITIONS FOR THE ANALYSIS OF COVARIANCE

	Number of Cases		
Treatment	Superintendent Analysis	Elementary Analysis	Secondary Analysis
$A_1B_1C_1$	16	24	21
$A_1B_1C_2$	6	4	10
$A_1B_2C_1$	6	19	15
$A_1B_2C_2$	12	6	25
$A_2B_1C_1$	16	25	12
$A_2B_1C_2$	8	6	10
$A_2B_2C_1$	16	19	9
$A_2B_2C_2$	15	7	7
Total	94	110	109

In the superintendent's analysis similar procedures were used to test the hypotheses concerning the relationships between independent and intervening variables. A 2 x 2 x 2 analysis of variance design was used. Cell assignments were identical to those reported for the major hypotheses.

The relationship between the intervening and dependent variables utilizes a t-test of the difference between means. Superintendents who were low on either perceived need for change or perceived power to innovate or both were considered as one group and superintendents who were high on both measures constituted the second group.

The methodology outlined in this chapter applies to the procedures used with the analysis of the superintendent's and principal's data. These analyses are presented in Chapters IV and V. The nature of the joint analysis required modification in both the tenure and innovation measures. These alterations are discussed at the beginning of Chapter VI.

Supplementary Variables

The variables used in the hypotheses of the study have been described. Data were also collected relative to the variables presented below:

> Building size refers to the number of teachers in an elementary or secondary school.
>
> Principal's or Superintendent's age was reported in 5 categories: 20-29, 30-39, 40-49, 50-59, 60 or more.
>
> Board Attitude Toward Change was reported by superintendents. Each superintendent rated the eagerness of his board to adopt new educational practices. A seven point scale ranging from hesitant to eager was used.

> Superintendent's Attitude Toward Change was reported by elementary and secondary principals. Each principal indicated the eagerness of his superintendent to adopt new educational practices by checking a seven point scale which varied from hesitant to eager.
>
> Superintendent's Aspiration Level was measured by nine items which are adaptations of those used by Gross, Mason and McEachern (1958, p. 352). The items included relate to the superintendent's interest in obtaining a superintendency in a larger district, being more influential in professional organizations, and enhancing his reputation in the community or with professional colleagues.

Other information gathered, but not included in the present analysis consisted of data related to: tax rate, enrollment, assessed valuation per pupil, salary, training level, and recency of education. Information about the amount of influence the superintendent could exert to overcome resistance from other administrators, teachers, the board of education, and the community was also collected.

Supplementary Procedures

The procedures which have been outlined were used to test the hypotheses of the study. They are, however, not well suited to the identification of additional variables which influence innovation. Simple correlation coefficients provide a convenient means for taking an exploratory look at the data. For this reason, and because the simple correlations form the basis for more sophisticated types of regression analysis, the correlation matrices are included.

Multiple regression will be used to examine the relationship between a single dependent variable and a number of independent variables. Partial correlation indicates the correlation between two variables when the effects of the other variables have been controlled.

Multiple correlation, on the other hand, indicates how much of the variance in the dependent variable can be explained by a group of independent variables acting together.

It should be noted that one of the variables, succession pattern, used in the multiple regression is dichotomous. While this practice is somewhat uncommon, it is completely appropriate. As Guilford (1965, p. 322) explains, computer programs for Pearson Product Moment Correlations yield point biserial correlations between continuous and dichotomized variables. The point biserial correlation is a product moment correlation and can be used in combination with other product moment coefficients in a multiple regression equation (Walker and Lev, 1953, p. 262).

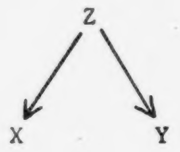
The usefulness of partial correlation may be increased through the use of step-wise regression. This procedure provides a standard analysis and then eliminates the independent variables, one-by-one, until only those that have a significant relationship with the dependent variable are included in the final analysis.

The concern of the study is not limited to the testing of hypotheses or the identification of variables that relate to innovation, but also includes the development of a causal model that will explain the innovative behavior of school districts. The methods of causal inference are particularly appropriate for this purpose. The discussion of relationships presented in Chapters IV and V makes use of this approach.

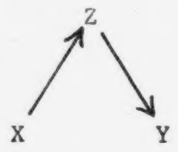
A few general statements about causal inference and its relation to regression analysis can not hope to do justice to this technique. The discussion that follows is intended to provide only a brief introduction to the procedure as it is used in this study. More complete consideration of this approach is given by Blalock (1964).

When the relationship between two variables, X and Y, is decreased by the introduction of a third variable Z, two alternative explanations are possible: a) the initial correlation is caused by one or more outside variables and the relationship is spurious, or b) the process by which X leads to Y has been traced.

This may be diagrammed as follows:



Case 1



Case 2

Case 1 is an example of a spurious relationship between X and Y, while Case 2 is an example of the situation where the manner in which X relates to Y has been traced. The choice between the two explanations rests upon logical rather than statistical grounds. The critical issue is the direction of causality between X and Z. In both cases the introduction of Z in a regression analysis in which Y is considered the dependent variable, results in the same decrease in the magnitude of the relationship between X and Y.

The joint secondary and elementary analysis presented in Chapter VI considers variables associated with the superintendent and the principal simultaneously. Multiple correlation is used to examine the relative contribution of the two sets of variables. Attention is also given to the total amount of the variance in secondary and elementary innovation that can be explained by all of the relevant variables included in the study.

CHAPTER IV

THE PRINCIPAL'S ANALYSIS

The expected relationships between the tenure, succession pattern, and reference group orientation of the principal and the innovation-ratio are stated in the following hypotheses:

1. The rate of innovation in an organization is inversely related to the tenure of the principal.
2. The rate of innovation in an organization will be greater if the successor to the principal is from outside the organization than if he is from inside the organization.
3. The rate of innovation will be greater if the principal has a "cosmopolitan orientation" than if he has a "local orientation."

An analysis of covariance design, calculated by means of the multiple linear regression model was used to test the hypotheses. This procedure permitted a determination of the unique variance associated with each of the independent variables and a determination of interaction effects between the independent variables. The hypotheses were tested separately for secondary and elementary principals.

The Secondary Principal's Analysis

Before testing the hypotheses it is appropriate to examine the relationship between independent variables and to consider the effect of the control variables upon the analysis. The relationships among tenure, succession pattern, and reference group orientation are shown in Table 8.

TABLE 8

SIMPLE CORRELATION BETWEEN THE 3 INDEPENDENT VARIABLES

	Tenure	Succession
Succession	-.05	
Orientation	.02	.20*

*Significant at the .05 level (two-tailed test)

It should be noted that tenure, succession pattern, and reference group orienation are relatively independent of each other. While the correlation between succession and reference group orientation is significant, only 4% of the variance is explained.

The relationship between the control variables, expenditure level and size, and the independent and dependent variables of the study are shown in Table 9.

TABLE 9

THE SIMPLE CORRELATION OF THE CONTROL VARIABLES
WITH THE OTHER VARIABLES OF THE STUDY

	Independent Variables			Dependent Variable
Control Variable	Tenure	Succession	Orientation	Innovation
Expenditure	.04	.06	.08	.27**
Size	-.01	-.17	.21*	.13

*Significant at the .05 level (two-tailed test)
**Significant at the .01 level (two-tailed test)

In order for a covariate to influence the results, it must relate to one or more independent variables and also to the dependent variable. Although the correlations are small, it was felt that they were sufficient to justify retention of expenditure and size as covariates. This had the further advantage of providing an analysis that was parallel to the original superintendent's analysis (Reynolds, 1965).

Principals were assigned to the eight cells according to the procedures outlined in Chapter III. The number of cases and the means and standard deviations for each cell are given in Table 10.

TABLE 10

SUMMARY OF MEANS AND STANDARD DEVIATIONS FOR EACH OF THE EIGHT CELLS IN THE SECONDARY PRINCIPALS ANALYSIS

	Short Tenure				Long Tenure			
	Inside		Outside		Inside		Outside	
	Local	Cos.	Local	Cos.	Local	Cos.	Local	Cos.
Cell	1	2	3	4	5	6	7	8
N	21	10	14	25	12	10	10	7
Mean	115	110	103	187	82	119	095	132
Std. Dev.	94	76	77	104	54	52	53	50

Test of the Hypotheses

The results of the analysis of covariance are shown in Table 11.

TABLE 11

ANALYSIS OF COVARIANCE SUMMARY TABLE OF SIGNIFICANCE OF DIFFERENCE IN INNOVATION AMONG SECONDARY PRINCIPALS WHO DIFFER IN TENURE, SUCCESSION PATTERN, AND REFERENCE GROUP ORIENTATION.[a]

Source of Variation	Sum of Squares	d.f.	Mean Square	F
A: Tenure	10690.4	1	10690.4	1.83
B: Succession Pattern	32450.2	1	32450.2	5.56*
C: Orientation	8980.6	1	8980.6	1.54
AxB: Tenure x Succession	1440.8	1	1440.8	.25
AxC: Tenure x Orientation	1382.0	1	1382.0	.24
BxC: Succession x Orientation	19396.7	1	19396.7	3.33
AxBxC: Tenure x Succession X Orientation	3074.9	1	3074.9	.53
Within:	577362.5	99	5831.9	
Adjusted Total	654778.1	106		
Covar I: Expenditure	14.7	1	14.7	.00
Covar II: Size	85852.3	1	85852.3	14.72**
Total	740645.1	108		

*Significant at the .05 level (one-tailed test)
**Significant at the .01 level (one-tailed test)

[a] A multiple linear regression analysis was used to perform the calculations for this table.

The first hypothesis stated that there is an inverse relationship between the tenure of the principal and the innovation-ratio. The F-ratio for tenure is 1.83. This is not significant; therefore, the hypothesis was not confirmed. We must conclude that the tenure of the principal does not relate to innovation when succession pattern, reference group orientation, expenditure, and size are controlled.

The second hypothesis predicts that the rate of innovation will be greater if the successor to the principal is from outside the organization than if he is from inside the organization. The F-ratio of 5.56 is significant at the .05 level, and it was concluded that succession pattern relates to the level of innovation when the variance due to tenure, reference group orientation, size and expenditure is removed.

The mean innovation scores for insiders and outsiders were used to determine the direction of the relationship between succession pattern and innovation. The mean for 53 insiders was 107.1 and the mean for 57 outsiders was 141.4. Since this difference is in the predicted direction, the hypothesis is confirmed.

The third hypothesis indicates that the rate of innovation will be greater if the principal has a "cosmopolitan" orientation than if he has a "local" orientation. The F-ratio of 1.54 is not significant. The hypothesis was not confirmed and it was concluded that the reference group orientation of the principal does not relate to innovation when tenure, succession, size and expenditure are controlled.

No interaction effects were predicted in the hypothesis. The first and second order interactions reported in Table 11 were not significant.

The analysis indicates that only one of the three hypothesis related to secondary principals was confirmed. The rate of innovation is greater when the principal is an outside successor.

Discussion of the Secondary Principals' Analysis

Table 12 presents a matrix of the simple correlations among the variables considered in the analysis of secondary innovation. Three variables relate to secondary innovation; these variables are principal's reference group orientation ($r = .35^{**}$), district size ($r = .33^{**}$), and principal's succession pattern ($r = .19^{*}$).

The hypothesis that predicted that short tenure principals would be more innovative was not confirmed. However, the existing relationship was in the predicted direction. The correlations between tenure and the other variables used in the analysis of covariance are small (expenditure = .04, size = -.01, succession = -.06, orientation = .02); therefore, the lack of relationship can not be attributed to the intercorrelations. With regard to the secondary principal it must be concluded that tenure is not an important determinant of innovation. The relationship between tenure and innovation is not affected materially by the age of the principal. This would necessitate age correlating with both tenure ($r = .60$) and with innovation ($r = -.02$).

The succession pattern of the secondary principal was shown to be significantly related to innovation. The simple correlation of .19 is significant at the .05 level. Outside successors are associated with greater innovation. Table 12 also indicates that outsiders are more

TABLE 12

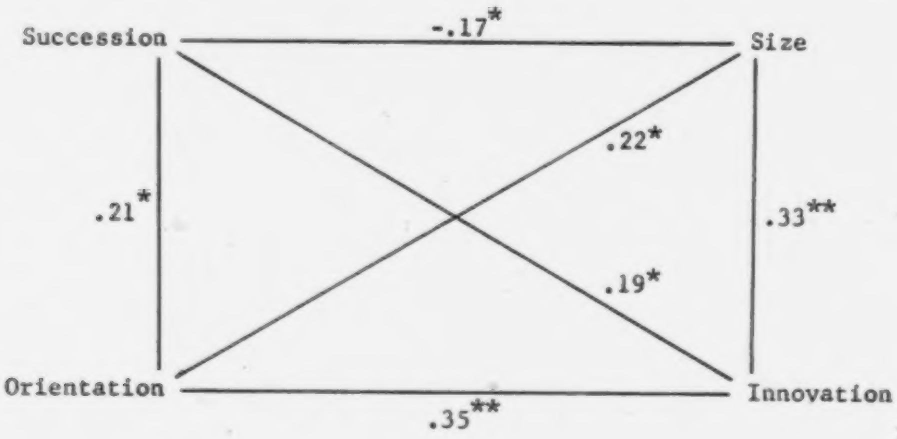
SIMPLE CORRELATION MATRIX FOR 9 VARIABLES ASSOCIATED WITH SECONDARY INNOVATION

Variable Name and Number		1	2	3	4	5	6	7	8
Expenditure	1								
District Size	2	04							
Building Size	3	00	53						
Superintendent's Attitude Toward Change	4	12	18*	09					
Principal's Age	5	07	14	21*	13				
Principal's Tenure	6	04	-01	05	18*	60**			
Principal's Succession	7	07	-17*	04	-22*	-03	-06		
Principal's Orientation	8	08	22*	20*	05	05	02	21*	
Secondary Innovation	9	04	33**	15	08	-02	-13	19*	35**

*Significant at the .05 level (one-tailed test)
**Significant at the .01 level (one-tailed test)

cosmopolitan (r = .21) and that there is a slight tendency for larger districts to promote from within the system (r = -.17).

The intercorrelations among size, succession pattern, and reference group orientation are sufficiently high that it is difficult to adequately consider their relationships with innovation in isolation. The simple correlations are shown in Figure 2. It may be noted that all correlations are significant at the .05 level (designated by*) or the .01 level (designated by **).



SIMPLE CORRELATIONS AMONG SIZE, SUCCESSION PATTERN,
REFERENCE GROUP ORIENTATION AND INNOVATION

FIGURE 2

In order to apply the techniques of causal inference, attention must first be given to establishing the direction of causality between variables. The correlations indicate the extent to which two measures vary together, but do not indicate a cause and effect relationship.

The rationale presented the argument that succession and local-cosmopolitan orientation are causes of innovation. The reverse argument would indicate that innovation causes outside succession or causes the administrator to become cosmopolitan seems less plausable. In Figure the lines connecting succession pattern and innovation and connecting reference group orientation and innovation have been changed to arrows which indicate the direction of causality.

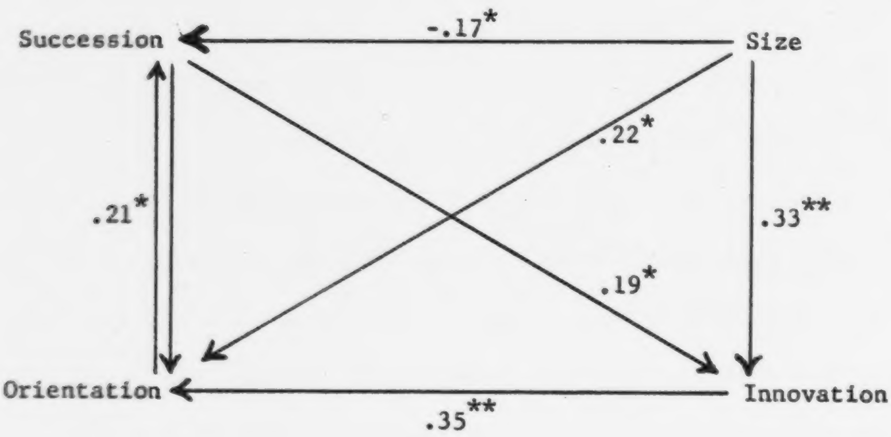
It is not reasonable to expect that the size of a district increases as a consequence of innovation, but it is reasonable to expect that the size of a district might affect the amount of innovation that occurs. Size is viewed as a cause of innovation.

To argue that large and small districts follow different employment practices and that large districts tend to promote from within and that small districts tend to employ outsiders is entirely plausable. To argue the reverse, districts that employ outside principals become small, is not plausable. Size is viewed as a cause of succession pattern.

It is more reasonable to argue that large districts hire principals who are cosmopolitan, than to argue that having a cosmopolitan principal causes a district to become large. Size is considered to be a cause of reference group orientation.

The direction of causality between succession pattern and reference group orientation presents a more difficult problem. It may be argued that outside successors are more cosmopolitan because they have had a broader range of contacts than inside successors. This possibility is accepted and orientation is viewed as being caused by succession pattern.

It may also be argued that persons with a cosmopolitan orientation are less "place-bound" and that they are therefore more likely to move from one district to another, thus becoming outside successors. This possibility is also accepted and succession pattern is viewed as being caused by reference group orientation. The second argument appears to be the stronger; however, in order to allow for both possibilities, the relationship is considered to be reciprocal, and succession pattern and reference group orientation are connected by two arrows in Figure 3

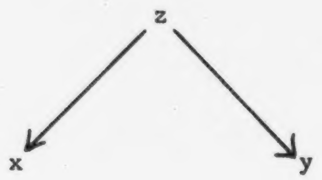


DIRECTIONS OF CAUSALITY AMONG SIZE, SUCCESSION PATTERN, REFERENCE GROUP ORIENTATION AND INNOVATION

FIGURE 3

Attention is now given to determining which of the relationships shown in Figure 3 are real and which are spurious. This will be done by considering the change in the relationship between 2 variables when one or more others are introduced as controls.

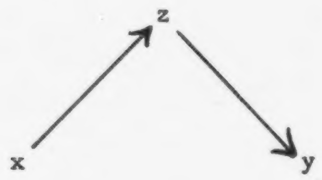
In Chapter III (page 51) it was indicated that a relationship between two variables may be considered spurious if a third variable is the cause of both. This situation is shown in Figure 4 . Under these conditions, the correlation between x and y should approximate zero when z is introduced as a control ($r_{xy.z} = 0$). If the relationship that remains when z is controlled is significant, the relation is real.



CASE 1 WHERE THE RELATION BETWEEN
X AND Y IS SPURIOUS

FIGURE 4

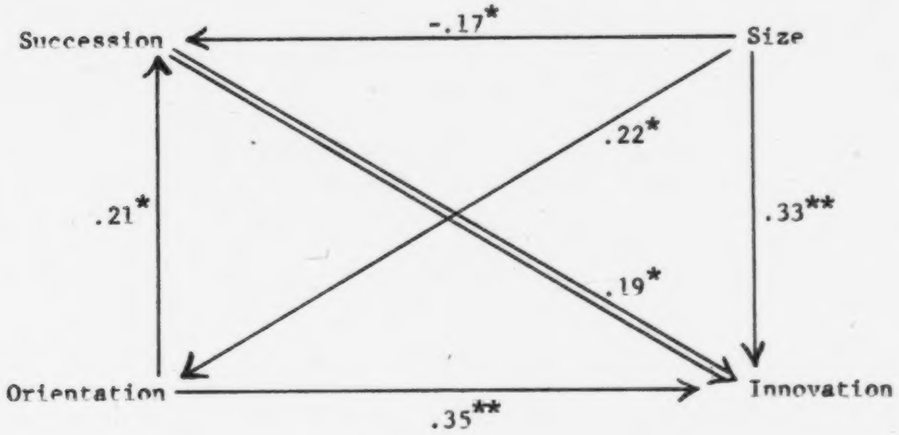
When the relationship between x, y, and z is like that shown in Figure 5, the relationship between x and y is real and z is an intervening variable which traces the process by which x and y are related. As in the first case, the correlation between x and y should approximate zero when z is introduced as a control variable ($r_{xy.z} = 0$). The choice between Case 1 and Case 2 is established on logical rather than statistical grounds. The directions of causality determined above govern the choice in each case.



CASE 2 WHERE Z IS AN
INTERVENING VARIABLE

FIGURE 5

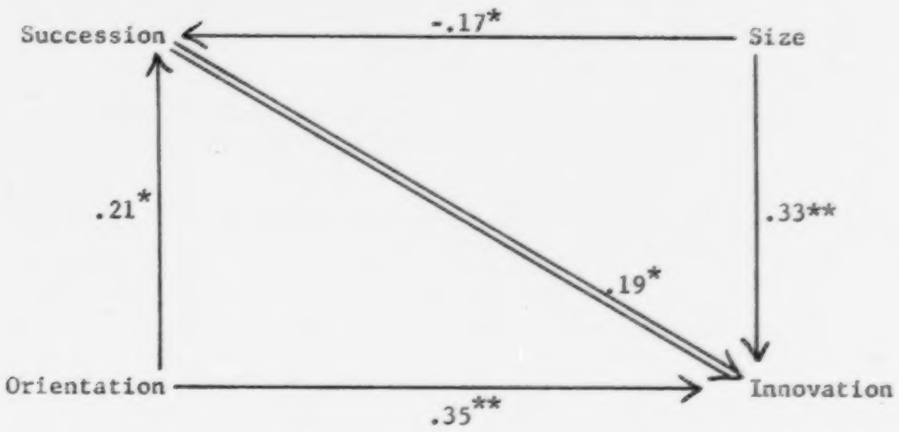
Following conservative practice, the model which is least favorable to the relationship being established will be used. Thus, when examining succession pattern the model is diagrammed as shown in Figure 6.



CAUSAL RELATIONSHIPS FOR EXAMINING
SUCCESSION PATTERN

FIGURE 6

Since the relationship between size and local cosmopolitan orientation is not relevant to the consideration of succession pattern, the model may be simplified as shown in Figure 7. A double arrow is used to represent the relationship in question.



THE SIMPLIFIED CAUSAL MODEL
FOR SUCCESSION PATTERN

FIGURE 7

In Figure 7 there are two examples of a Case 1 relationship. The relationship between succession pattern and innovation may be caused by a third variable, size, which is correlated with both the independent variable and the dependent variable. The second example is similar except that the third variable is reference group orientation.

If the relationship between succession pattern and innovation is significant when size and reference group orientation are controlled, the relationship is real. If, on the other hand, it is not significant; it must be concluded that the relationship between succession and innovation is spurious. Table 13 shows the results of such a regression.

TABLE 13

PARTIAL CORRELATIONS FOR THE RELATIONSHIP BETWEEN INNOVATION AND SUCCESSION, REFERENCE GROUP ORIENTATION AND SIZE

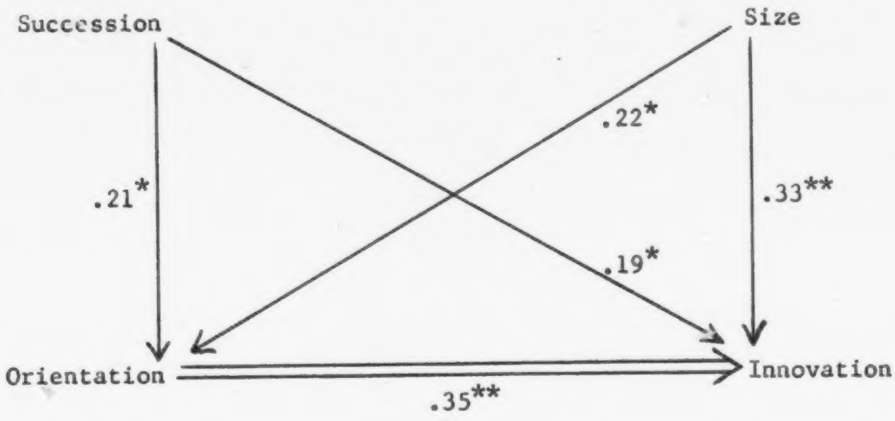
Variable	Beta Weight	t-value	Partial r
Succession	.190	2.11	.20*
Reference Group Orientation	.241	2.66	.25**
Size	.315	3.50	.32**

Multiple R^2 = .21

*Significant at the .05 level (one-tailed test)
**Significant at the .01 level (one-tailed test)

The correlation between succession and innovation was increased from .19 to .20 when the outside variables were introduced. The relationship is real and does not result from the inter-correlations with size and orientation.

Following the procedures used in the consideration of succession pattern, the relations of concern in an investigation of orientation may be diagrammed in a manner shown in Figure 8.



THE SIMPLIFIED CAUSAL MODEL FOR
REFERENCE GROUP ORIENTATION

FIGURE 8

The relationship between orientation and innovation may be caused by the outside variables size and succession pattern. If this is the case, controlling for size and succession should cause the resulting partial correlation between orientation and innovation to approximate zero; i.e., fail to be significant.

Since the variables used in the consideration of succession pattern and orientation are the same, Table 13 may be used for both examinations. The introduction of the outside variables causes the correlation to decrease from .35 to .25 (significant at the .01 level). Since the correlation remains significant, it is concluded that the relationship between orientation and innovation is real.

Table 11, based upon an analysis of covariance design, indicates that the relationship between orientation and innovation is not significant (F = 1.54) and Table 13, based upon partial correlation, indicates that the relationship between orientation and innovation is significant at the .01 level. In order to make the analysis comparable it is necessary to add expenditure level and tenure to the regression analysis. Table shows the results of such an addition. When these two variables are added, orientation remains significant at the .01 level.

TABLE 14

PARTIAL CORRELATIONS FOR THE RELATIONSHIP BETWEEN EXPENDITURE, SIZE, TENURE, SUCCESSION PATTERN, AND REFERENCE GROUP ORIENTATION

Variable	Beta Weight	t-value	Partial r
Expenditure	.002	.026	.00
Size	.311	3.452	.32**
Tenure	-.123	-1.428	-.14
Succession	.181	2.010	.19*
Orientation	.246	2.714	.26**
Multiple R^2 = .24			

*Significant at the .05 level (one-tailed test)
**Significant at the .01 level (one-tailed test)

The conflicting results are caused by the nature of the analyses. A major difference in the two forms is the type of data that is used. The analysis of covariance uses continuous data for the covariates and dichotomous scores for the independent variables, while partial correlation uses continuous data for all variables. Since succession is dichotomous in both analyses, similar results were expected and found. In the case of reference group orientation, the analysis utilizing partial correlation is more sensitive to the data; therefore, a stronger relationship was found.

The analysis, utilizing partial correlation suggests that reference group orientation receive further attention in the development of models which attempt to explain innovation.

Table 14 indicates that the relationship between size and secondary innovation is significant when the effect of expenditure, tenure, succession pattern, and reference group orientation is controlled. Secondary schools located in larger districts are more innovative than secondary schools which are a part of smaller systems.

The three variables whose simple correlations with innovation were significant are the same as the three variables that were found to relate significantly when the effect of the other variables was partialed out. The principal's succession pattern and reference group orientation and district size are related to secondary innovation.

District expenditure level does not relate (r = .04) to the level of innovation. It is also interesting to note that this variable bears little relationship to any of the other variables considered in the analysis of secondary innovation.

The amount of variance in secondary innovation that can be explained by the variables of the study is considered in the joint secondary analysis presented in Chapter VI.

The Elementary Principal's Analysis

The relationship between tenure, succession pattern, and reference group orientation are shown in Table 15.

TABLE 15

SIMPLE CORRELATIONS AMONG THE 3 INDEPENDENT VARIABLES

	Tenure	Succession
Succession	-.02	
Orientation	.00	.08

The relationships among the independent variables are small and not significant. Because of the low inter-correlations, removing the variance due to one independent variable will have little effect upon the others.

The relationships between expenditure level and size and each of the other variables of the study are shown in Table 16. The largest relationship, .21, is between expenditure and reference group orientation. Expenditure also relates to innovation-ratio. While the relationships for expenditure and size are small, these variables were retained as control variables in order that the form of analysis used for the superintendent, secondary principal and elementary principal would be identical.

TABLE 16

THE SIMPLE CORRELATION OF THE CONTROL VARIABLES WITH THE OTHER VARIABLES OF THE STUDY

	Independent Variables			Dependent Variable
Control Variable	Tenure	Succession	Orientation	Innovation
Expenditure	-.01	-.02	.21*	.12
Size	.03	-.10	.09	.05

*Significant at the .05 level (two-tailed test)

Elementary principals were assigned to the 8 cells according to the procedures outlined in Chapter III. A number of cases and the means and standard deviations are presented in Table 17.

TABLE 17

SUMMARY OF MEANS AND STANDARD DEVIATIONS FOR EACH OF THE EIGHT CELLS IN THE ELEMENTARY PRINCIPALS ANALYSIS

	Short Tenure				Long Tenure			
	Inside		Outside		Inside		Outside	
	Local	Cos.	Local	Cos.	Local	Cos.	Local	Cos.
Cell	1	2	3	4	5	6	7	8
N	24	4	19	6	25	6	19	7
Mean	118	168	143	187	70	57	80	109
Std. Dev.	139	124	108	50	43	26	54	64

Test of the Hypotheses

The results of the analysis of covariance are shown in Table 18.

TABLE 18

ANALYSIS OF COVARIANCE SUMMARY TABLE OF SIGNIFICANCE OF DIFFERENCE IN INNOVATION AMONG ELEMENTARY PRINCIPALS WHO DIFFER IN TENURE, SUCCESSION PATTERN, AND REFERENCE GROUP ORIENTATION[a]

Source of Variation	Sum of Squares	d.f.	Mean Square	F
A: Tenure	101165.4	1	101165.4	12.48**
B: Succession Pattern	20597.0	1	20597.0	2.54
C: Orientation	3713.5	1	3713.5	.46
AxB: Tenure x Succession	699.1	1	699.1	.09
AxC: Tenure x Orientation	6314.5	1	6314.5	.78
BxC: Succession x Orientation	5405.4	1	5405.4	.67
AxBxC: Tenure x Succession x Orientation	2259.5	1	2259.5	.28
Within:	810302.0	100	8103.0	
Adjusted Total:	950456.4	107		
Covar I - Expenditure	20789.6	1	20789.6	2.57
Covar II - Size	5833.6	1	5833.6	.72
Total	977079.6	109		

*Significant at the .05 level (one-tailed test)
**Significant at the .01 level (one-tailed test)

[a] A multiple linear regression analysis was used to perform the calculations for this table.

The first hypothesis predicted an inverse relationship between the tenure of the principal and the innovation ratio. The F-ratio of 12.48 associated with the first hypothesis is significant at the .01 level. The hypothesis was confirmed and it was concluded that the tenure of the principal relates to innovation when succession pattern, reference group orientation, expenditure, and size are controlled.

The mean innovation score for the 53 short tenure principals is 135.7, and the mean for the 57 long tenure principals is 76.7. Since the difference is in the predicted direction it is concluded that the first hypothesis was confirmed.

The second hypothesis predicts that the rate of innovation will be greater if the successor to the principal is from outside the organization than if he is from inside the organization. An F-ratio of 2.54 is associated with the second hypothesis. This ratio is not sufficient to support the hypothesis. The succession pattern of the elementary principal does not relate to innovation when tenure, reference group orientation, expenditure level, and size are controlled.

The third hypothesis indicates that the rate of innovation will be greater if the principal has a "cosmopolitan" orientation than if he has a "local" orientation. An F-ratio of .46 is associated with the third hypothesis. This ratio is not significant and the hypothesis is not supported. The reference group orientation of the elementary principal does not relate to innovation when tenure, succession pattern, expenditure level, and size are controlled.

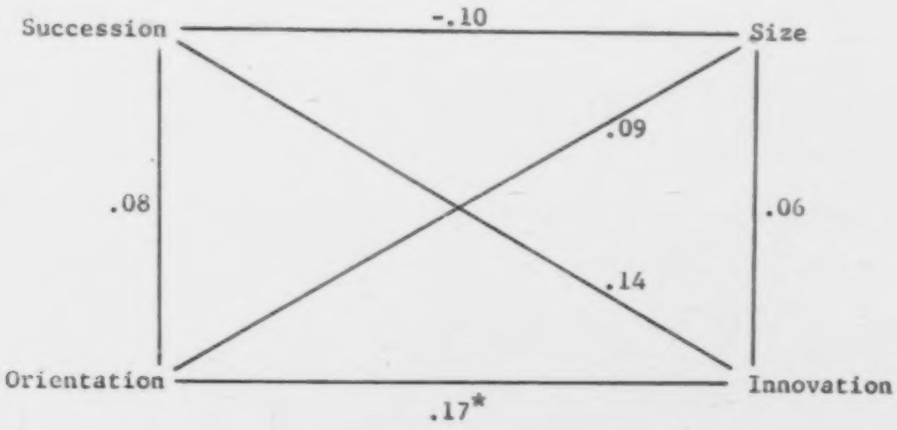
No interaction effects were predicted in the hypotheses. The first and second order interactions reported in Table 18 were not significant.

The analysis indicates that only one of the three hypotheses related to elementary principals was confirmed. The rate of innovation is greater for short tenure elementary principals than for long tenure elementary principals.

Discussion of the Elementary Principal's Analysis

Table 19 presents a matrix of the simple correlations among the variables considered in the analysis of elementary innovation. It may be noted that 3 variables relate to elementary innovation. These variables, in order of the strength of the relationship are: principal's age (-.29**), principal's tenure (-.29**), and reference group orientation (.17*).

In the secondary analysis size, succession pattern, and reference group orientation were considered jointly because of the significant intercorrelations between these variables. Figure 9 shows the level of these relationships for elementary innovation. In view of the size of the intercorrelations, a similar approach to the analysis is not meaningful.



THE SIMPLE CORRELATIONS AMONG DISTRICT SIZE, SUCCESSION PATTERN REFERENCE GROUP ORIENTATION, AND ELEMENTARY INNOVATION

FIGURE 9

TABLE 55

MATRIX OF THE SIMPLE CORRELATIONS AMONG THE VARIABLES CONSIDERED IN THE ANALYSIS OF ELEMENTARY INNOVATION

Variable Name and Number		1	2	3	4	5	6	7	8
Expenditure	1								
District Size	2	01							
Building Size	3	-15	07						
Superintendent's Attitude Toward Change	4	-03	08	-05					
Principal's Age	5	-12	00	-08	-06				
Principal's Tenure	6	-02	03	-10	-15	52**			
Principal's Succession	7	-02	-10	16*	10	-15	-02		
Principal's Orientation	8	21*	09	09	-16*	-02	00	08	
Elementary Innovation	9	12	06	-01	06	-29**	-29**	14	17*

*Significant at the .05 level (one-tailed test)
**Significant at the .01 level (one-tailed test)

A step-wise regression was used to determine the relationship between each of the 8 variables included in the correlation matrix and elementary innovation. This procedure considers all eight variables and then eliminates variables one at a time until only those that have a significant relationship with the independent variable remain. The total amount of variance that can be accounted for by the weighted set of variables is indicated by the multiple correlation squared (often referred to as the coefficient of determination).

Table 20 shows the results of the regression analysis for the 8 variables with elementary innovation serving as the dependent variable. The partial correlation shows the strength of the relationship between an independent variable and elementary innovation when the influence of the other 7 independent variables is eliminated.

TABLE 20

REGRESSION ANALYSIS FOR THE RELATIONSHIP BETWEEN 8 VARIABLES AND ELEMENTARY INNOVATION

Variable	Beta Weight	t-value	Partial r
Expenditure Level	.060	.634	.06
District Size	.065	.694	.07
Building Size	-.072	-.760	-.07
Principal's Perception of Superintendent's Attitude Toward Change	.021	.221	.02
Principal's Age	-.156	-1.433	-.14
Principal's Tenure	-.207	-1.917	-.19*
Principal's Succession Pattern	.120	1.257	.12
Principal's Reference Group Orientation	.144	1.505	.15

Multiple $R^2 = .16$

*Significant at the .05 level (one-tailed test)

The relationship between the elementary principal's tenure and innovation (-.18) is the only significant relationship. However, a more complete picture of the relationship of the independent and dependent variables may be obtained by tracing the manner in which the independent variables are eliminated (see Table 21).

TABLE 21

STEP-WISE REGRESSION FOR 8 VARIABLES RELATED TO ELEMENTARY INNOVATION

Elimination	Variable	t-value[a]	loss in predictiveness[b]	remaining predictiveness[c]
first	Principal's Perception of Superintendent's Attitude toward change	.222	.1	15.8
second	Expenditure Level	.637	.4	15.4
third	District Size	.734	.4	15.0
fourth	Building Size	.853	.6	14.4
fifth	Principal's Succession	1.095	1.0	13.4

[a] This is the t-value from the last regression prior to the elimination of the variable

[b] This indicates the difference between the percent of the variance explained when the variable is included and when it is not.

[c] This indicates the percent of the variance that is accounted for by the remaining variables in the regression.

The principal's perception of the superintendent's attitude toward change has the lowest t-value and is therefore the first to be eliminated. The elimination of this variable causes a loss in predictive efficiency of only .1%. After its elimination, 15.8% of the variance is explained by the other 7 variables.

The step-wise regression eliminated five of the eight variables. The partial correlations for the 3 remaining variables, age, tenure, and reference group orientation; are shown in Table 22. All three partial correlations are significant at the .05 level.

TABLE 22

PARTIAL CORRELATIONS FOR 3 VARIABLES THAT RELATE TO ELEMENTARY INNOVATION

Variable	Beta Weight	t-value	Partial r
Principal's Age	.011	-1.76	-.168*
Principal's Tenure	.011	-1.81	-.172*
Principal's Reference Group Orientation	.008	1.81	.172*

Multiple $R^2 = .13$

*Significant at the .05 level (one-tailed test)

In the preceding analysis, it was again shown that the succession pattern of the elementary principal is not significantly related to innovation. It should, however, be noted that the difference which existed was in the predicted direction. That is, outside successors were associated with a higher level of innovation.

This analysis, like the earlier analysis of covariance, demonstrated that the tenure of the principal relates to the level of innovation. It should, however, be noted that the strength of the relationship was reduced when the age of the principal was taken into consideration.

The analysis indicates that the age of the principal relates to the level of innovation. This relationship remains significant when tenure is controlled. This finding suggests the value of considering age in models that attempt to explain innovation.

The step-wise regression demonstrated that the reference group orientation of the elementary principal relates to innovation. This relationship was not significant in the analysis of covariance. The difference in findings results from the increased sensitivity of the regression analysis. The significant partial correlation associated with reference group orientation indicates that this concept is useful in examining elementary innovation.

The simple correlations between elementary innovation and the 3 independent variables were significant. These same variables; age, tenure, and reference group orientation; were also shown to be significantly related when the effect of the other variables was partailed out. Two of the variables which related significantly with secondary innovation were not found to be related to elementary innovation. These 2 variables are district size, and the principal's succession pattern. Two other variables, the principal's age and his tenure, were found to relate only to elementary innovation. Further attention to these findings is given in Chapter VII.

CHAPTER V

THE SUPERINTENDENT'S ANALYSIS

This chapter examines the relationship between variables associated with the superintendent and district innovation. This is a re-analysis of the data used in an earlier study by Reynolds (1965). The three major hypotheses from the earlier study are retested using the new local-cosmopolitan scale. This measure was developed when it was found that the factor structure of the original measure could not be replicated with the data for elementary and secondary principals (see page 36). The analysis related to the intervening variables, perceived need for change and perceived power to innovate, has been re-formulated to more adequately test the model.

The analysis is reported in three parts. The first part tests the hypotheses which state expected relationships between the independent and the dependent variables. These are diagrammed in Figure 10.

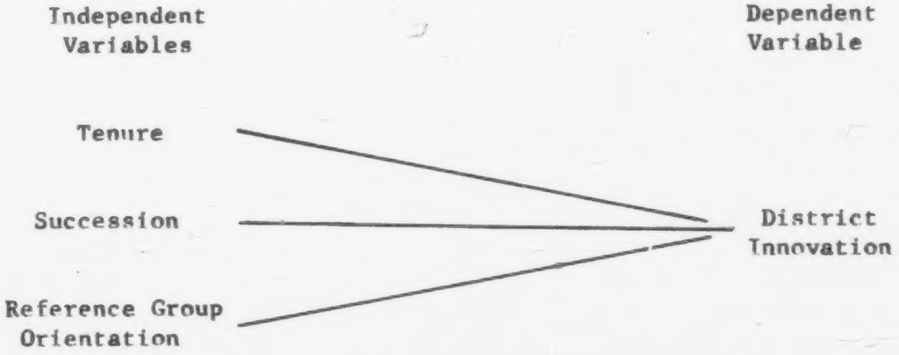


FIGURE 10

RELATIONSHIPS EXAMINED IN PART 1

The second part considers the relationships between the independent and intervening variables, as diagrammed in Figure 11.

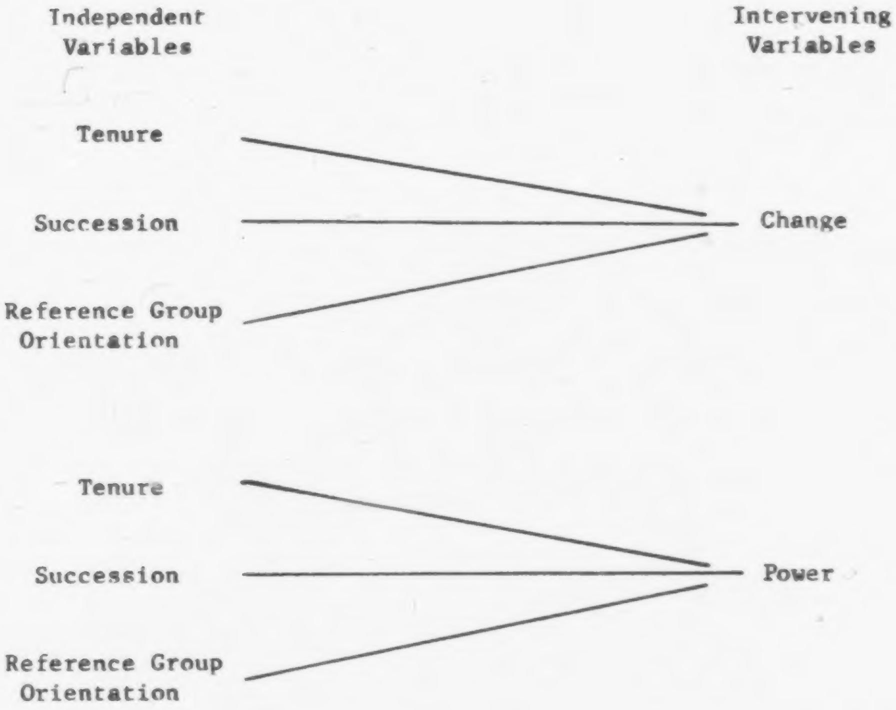


FIGURE 11

RELATIONSHIPS EXAMINED IN PART 2

The third part examines the relationship between the intervening and dependent variables, as diagrammed in Figure 12.

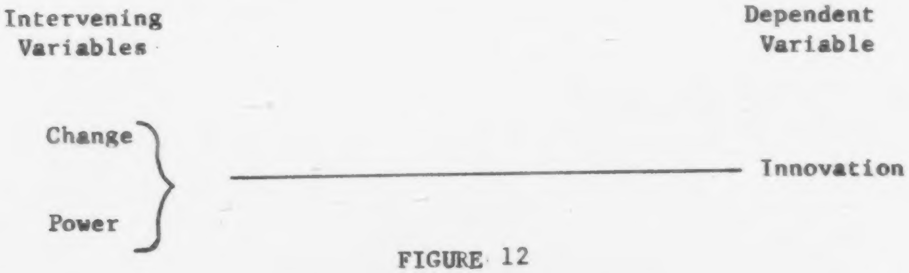


FIGURE 12

RELATIONSHIPS EXAMINED IN PART 3

Part I: Relationship Between Independent and Dependent Variables

The expected relationship between the tenure, succession pattern, and reference group orientation of the superintendent and the innovation-ratio are stated in the following hypotheses:

1. The rate of innovation in an organization is inversely related to the tenure of the superintendent.
2. The rate of innovation in an organization will be greater if the successor to the superintendent is from outside the organization than if he is from inside the organization.
3. The rate of innovation will be greater if the superintendent has a "cosmopolitan orientation" than if he has a "local orientation."

Before testing the hypotheses it is appropriate to examine the relationship between independent variables and to consider the effect of the control variables upon the analysis. The relationships among tenure, succession pattern, and reference group orientation are shown in Table 23.

TABLE 23

SIMPLE CORRELATIONS BETWEEN THE 3 INDEPENDENT VARIABLES

	Tenure	Succession
Succession	-.02	
Orientation	-.05	.25*

*Significant at the .05 level (two-tailed test)

Tenure is independent of the other two variables. The correlation between succession and reference group orientation is significant. As might be expected, insiders tend to have a local reference group orientation and outsiders tend to have a cosmopolitan orientation. The intercorrelation between these two independent variables will alter the relationships found between the independent and dependent variables.

The relationship of the control variables to the independent and dependent variables is given in Table 24. The correlations between expenditure and reference group orientation and between size and innovation are significant.

A control variable will influence the results if it relates to one or more independent variables and also to the dependent variable. The size of the correlations is sufficient to justify retention of both control variables as covariates in the analysis.

TABLE 24

THE SIMPLE CORRELATION OF THE CONTROL VARIABLES WITH THE OTHER VARIABLES OF THE STUDY

	Independent Variables			Dependent Variable
Control Variable	Tenure	Succession	Orientation	Innovation
Expenditure	.08	.14	.22*	.13
Size	.15	.02	.16	.30**

*Significant at the .05 level (two-tailed test)
**Significant at the .01 level (two-tailed test)

The statistical procedures of the original analysis were followed. An analysis of covariance design, calculated by means of the multiple linear regression model was used to test the hypotheses. The superintendents were assigned to the eight cells according to the procedures outlined in Chapter III. The number of cases and the means and standard deviations for each cell are given in Table 25.

TABLE 25

SUMMARY OF MEANS AND STANDARD DEVIATIONS FOR EACH OF THE EIGHT CELLS IN THE SUPERINTENDENT'S ANALYSIS

	Short Tenure				Long Tenure			
	Inside		Outside		Inside		Outside	
	Local	Cos.	Local	Cos.	Local	Cos.	Local	Cos.
Cell	1	2	3	4	5	6	7	8
N	16	6	7	12	16	7	14	16
Mean	86.7	90.1	158.7	154.3	84.6	94.7	100.4	119.7
Std. Dev.	52.8	63.5	92.7	71.5	30.0	46.4	46.3	60.3

Test of the Hypotheses by Analysis of Covariance

The results of the analysis of covariance are shown in Table 26.

The first hypothesis stated that there is an inverse relationship between the tenure of the superintendent and the innovation ratio. The F-ratio of 6.77 is significant at the .05 level and it is concluded that the tenure of the superintendent relates to innovation when succession pattern, reference group orientation, expenditure, and size are controlled.

TABLE 26

ANALYSIS OF COVARIANCE SUMMARY TABLE OF SIGNIFICANCE OF DIFFERENCE IN INNOVATION AMONG SUPERINTENDENTS WHO DIFFER IN TENURE, SUCCESSION PATTERN, AND REFERENCE GROUP ORIENTATION.[a]

Source of Variation	Sum of Squares	d.f.	Mean Square	F
A: Tenure	18988.6	1	18988.6	6.77*
B: Succession Pattern	39088.2	1	39088.2	13.94**
C: Orientation	047.8	1	047.8	.02
AxB: Tenure x Succession	13744.6	1	13744.6	4.90*
AxC: Tenure x Orientation	1415.9	1	1415.9	.52
BxC: Succession x Orientation	248.2	1	248.2	.09
AxBxC: Tenure x Succession x Orientation	698.1	1	698.1	.25
Within:	235470.3	85	2770.2	
Adjusted Total	309701.7	92		
Covar I: Expenditure	3459.1	1	3459.1	1.23
Covar II: Size	40506.0	1	40506.0	14.45**
Total	353666.8	94		

*Significant at the .05 level (one-tailed test)
**Significant at the .01 level (one-tailed test)

[a] A multiple linear regression analysis was used to perform the calculations for this table.

The mean innovation score for the 41 short tenure superintendents is 122.5, and the mean for the 53 long tenure superintendents is 100.6. Since the difference is in the predicted direction, it is concluded that the first hypothesis was confirmed.

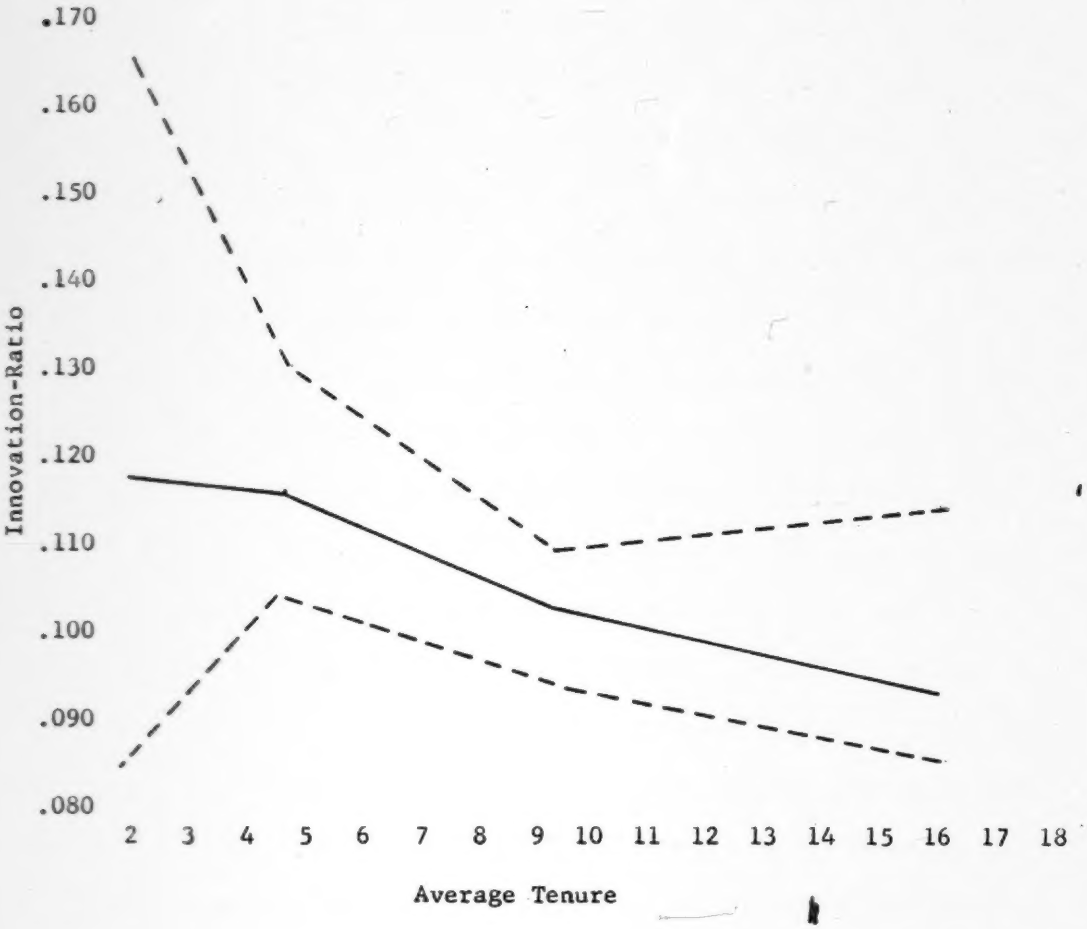
The second hypothesis predicted that the rate of innovation will be greater if the successor to the superintendent is from outside the organization than if he is from inside the organization. The F-ratio of 13.94 is significant at the .05 level. It was concluded that succession pattern relates to the level of innovation when the variance due to tenure, reference group orientation, size, and expenditure is removed.

The mean innovation scores for insiders and outsiders were used to determine the direction of the relationship between succession pattern and innovation. The mean for 45 insiders was 89.6 and the mean for 49 outsiders was 128.2. Since this difference is in the predicted direction, the hypothesis is confirmed.

The third hypothesis indicated that the rate of innovation will be greater if the superintendent has a "cosmopolitan" orientation than if he has a "local" orientation. The F-ratio of .02 is not significant; therefore, the hypothesis was not confirmed and it was concluded that the reference group orientation of the superintendent does not relate to innovation when tenure, succession pattern, size, and expenditure are controlled.

The F-ratio for the interaction between average tenure and succession pattern, F = 4.90, was statistically significant at the .05 level of confidence. The nature of the interaction is shown in Figure 13.

For "insiders" the rate of innovation increases during the first years in the position and then drops slowly over time. The pattern for "outsiders" indicates a high initial level of innovation and a pattern of decreasing innovation over time. The effect of tenure upon innovation rate is dependent upon the succession pattern of the superintendent.



THE INTERACTION BETWEEN TENURE
AND SUCCESSION PATTERN

FIGURE 13

Further Examination of District Innovation

The analysis of covariance has been used to determine the relationship between the independent and dependent variables. Two "main-effects," tenure and succession, and one interaction were found, tenure x succession. It should also be noted that one of the covariates, size, was related significantly to innovation (F = 14.45, significant at the .01 level).

Additional insights may be gained by examining the simple correlations between variables related to the superintendents' analysis (see Table 27) and by the use of partial correlation. The latter statistical approach has the advantage of providing a convenient means for examining the effect of adding or eliminating a variable from the analysis. It also has the advantage of permitting more complete use of the available data since it utilizes continuous tenure and reference group orientation scores.

The inclusion of additional variables and the increased sensitivity of the analysis may cause an alteration in the conclusions based upon the analysis of covariance. Since district size is an important determinant of innovation it will no longer be considered as a control variable. District size will be viewed along with the other variables as an independent variable.

The matrix of simple correlations between variables related to the superintendent's analysis is given in Table 27. These relationships are used in the discussion which follows.

The analysis of covariance found that tenure effects innovation directly and indirectly. Younger superintendents were found to be

TABLE 27

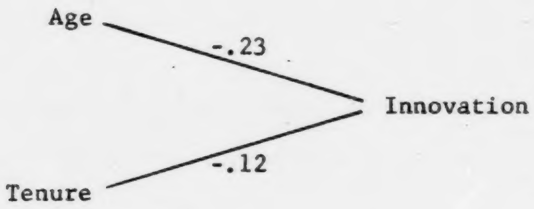
SIMPLE CORRELATION MATRIX FOR 12 VARIABLES RELATED TO THE SUPERINTENDENTS' ANALYSIS

Variable Name and Number		1	2	3	4	5	6	7	8	9	10	11
Expenditure	1											
Size	2	03										
Board Attitude	3	-07	29^{**}									
Superintendent's Attitude	4	17^{*}	12	16^{*}								
Superintendent's Age	5	-01	28^{**}	10	-21^{*}							
Superintendent's Tenure	6	09	15	03	-18^{*}	48^{**}						
Superintendent's Succession	7	14	03	-02	04	04	-02					
Superintendent's Orientation	8	22^{*}	16^{*}	09	36^{**}	-13	-05	25^{**}				
Superintendent's Change	9	01	19^{*}	08	16^{*}	-06	-12	26^{**}	37^{**}			
Superintendent's Power	10	-12	27^{**}	42^{**}	20^{*}	-02	09	01	30^{**}	07		
Superintendent's Aspiration	11	05	-15	07	11	-43^{**}	-21^{*}	11	22^{*}	07	-02	
Innovation	12	14	30^{**}	08	27^{**}	-23^{**}	-12	32^{**}	27^{**}	26^{**}	16^{*}	-03

*Significant at the .05 level (one-tailed test)
**Significant at the .01 level (one-tailed test)

associated with greater innovation. The length of time a superintendent has served also determines the extent and manner in which succession pattern influences innovation. Table 27 indicates that tenure and age correlate .48 (significant at the .01 level). The strength of this relationship suggests the value of considering age and tenure together.

The simple correlations among age, tenure, and innovation are shown in Figure 14.



THE SIMPLE RELATIONSHIP AMONG
AGE, TENURE AND INNOVATION

FIGURE 14

The relative importance of age and tenure is revealed when consideration is given to the correlation between age and innovation with tenure partialed out. These correlations are shown in Table 28.

The correlation between age and innovation decreases from -.23 to -.20 when tenure is introduced. This comparison also indicates that the correlation between tenure and innovation decreases from -.12 to -.01 when age is introduced. The amount of relationship that remains when the third variable is introduced indicates that age, rather than tenure, is important in innovation. (See the discussion of statistical inference in Chapter III, page 51). It is concluded that the tenure

TABLE 28

THE PARTIAL CORRELATIONS BETWEEN AGE AND INNOVATION
AND BETWEEN TENURE AND INNOVATION

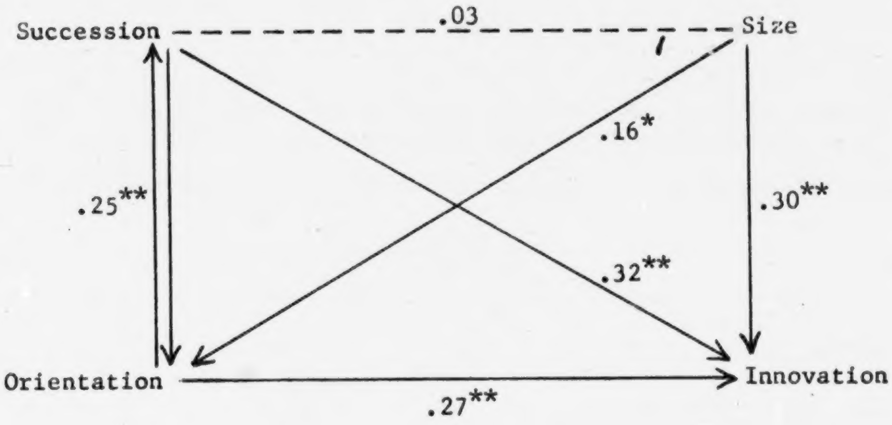
Variable	Beta Weight	t-value	Partial r
Age	-.224	-1.920*	-.20
Tenure	-.014	- .123	-.01
Multiple R^2 = .05			

*Significant at the .05 level (one-tailed test)

main effect found in Table 26 (page 85) is spurious and results from the relationships between age and tenure and between age and innovation.

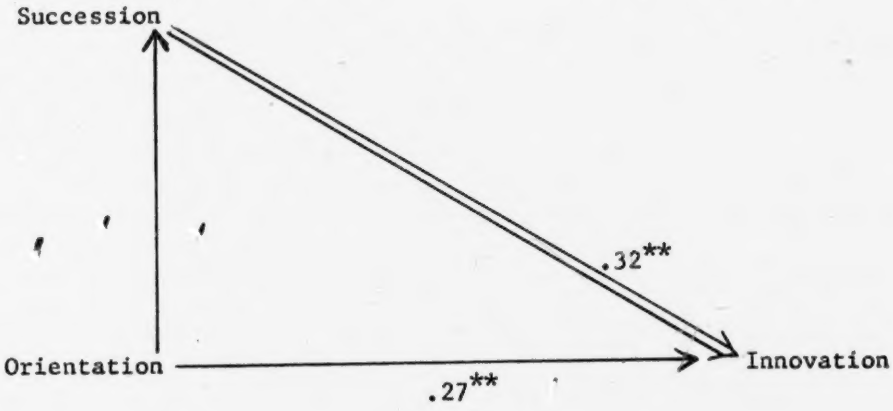
Following the pattern used in the secondary principal's analysis; size, succession pattern, and reference group orientation will be considered jointly. This procedure is followed because of the intercorrelations between these variables. The causal relationships and the simple correlations are shown in Figure 15. The direction of causality was established by reasoning similar to that presented in Chapter IV (see pages 62 to 63).

Figure 16 shows the simplified causal model for examining succession pattern. Size is omitted from the model because it does not relate to succession pattern (r = .03). The relation between succession pattern may be real or spurious. It is real if the relationship remains significant when reference group orientation serves as a control variable. Table 29 shows this analysis.



THE CAUSAL RELATIONSHIP AMONG SIZE, SUCCESSION PATTERN,
REFERENCE GROUP ORIENTATION AND INNOVATION

FIGURE 15



THE SIMPLIFIED CAUSAL MODEL
FOR SUCCESSION PATTERN

FIGURE 16

TABLE 29

PARTIAL CORRELATIONS FOR THE RELATIONSHIP BETWEEN INNOVATION AND SUCCESSION PATTERN AND REFERENCE GROUP ORIENTATION

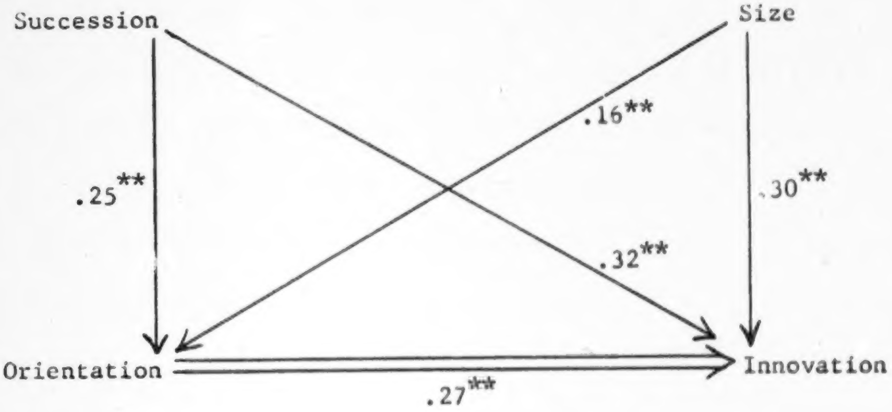
Variable	Beta Weight	t-value	Partial r
Succession pattern	.266	2.64	.27**
Reference group orientation	.198	1.97	.20*
Multiple R^2 = .14			

*Significant at the .05 level (one-tailed test)
**Significant at the .01 level (one-tailed test)

The simple correlation between succession pattern and innovation is .32 and the partial correlation is .27. Both correlations are significant. It is concluded that succession pattern relates to innovation. This is consistent with the findings reported in Table 26 (see page 85).

The causal model for examining reference group orientation is shown in Figure 17. The simple correlation between reference group orientation and innovation is .27 (significant at the .01 level). This relationship may be spurious and be caused by two external variables, size and succession pattern.

The partial correlations for orientation, succession, and size are shown in Table 30. The partial correlation for reference group orientation is .16 (not significant). This indicates that the relationship which exists when size and succession pattern are controlled may result from chance factors. Reference group orientation will receive further attention in connection with the intervening variables.



THE SIMPLIFIED CAUSAL MODEL FOR
REFERENCE GROUP ORIENTATION

FIGURE 17

TABLE 30

PARTIAL CORRELATIONS FOR THE RELATIONSHIP BETWEEN INNOVATION AND SIZE, SUCCESSION PATTERN AND REFERENCE GROUP ORIENTATION

Variable	Beta Weight	t-value	Partial r
Size	.269	2.85	.29**
Succession Pattern	.271	2.79	.28**
Reference Group Orientation	.152	1.54	.16

Multiple R^2 = .21

*Significant at the .05 level (one-tailed test)
**Significant at the .01 level (one-tailed test)

The preceding discussion has established that the superintendent's age and succession pattern and the size of the district influence innovation. It has also been shown that the superintendent's tenure determines the way succession effects innovation. Although the superintendent's reference group orientation was not found to relate to innovation, the relationship was found to be sufficient to merit further investigation.

Part 2: Relationships Between Independent and Intervening Variables

The expected relationships between the tenure, succession pattern, and reference group orientation of the superintendent and the superintendent's perceived need for change are stated in the following minor hypotheses:

a. The superintendent's perceived need for change will be inversely related to his tenure.

b. The superintendent's perceived need for change will be greater if he succeeded to the superintendency from a position outside the organization than if he was promoted from within the organization.

c. The superintendent's perceived need for change will be greater if he has a cosmopolitan orientation than if he has a local orientation.

The expected relationship between the tenure, succession pattern, and reference group orientation of the superintendent and the superintendent's perceived power to innovate are stated in the following minor hypothesis:

d. The superintendent's perceived power to innovate will be greater if he succeeded to the superintendency from a position outside the organization than if he was promoted from within the organization.

Hypotheses a, b, c and d are identical to the minor hypotheses stated in the earlier study by Reynolds (1965, p. 34-35). The form of analysis used to test the relationships between the three independent variables and each of the intervening variables was a 2 x 2 x 2 analysis of variance design. Cell designations and frequencies are identical to those used in the test of the major hypotheses. No control variables were used in this analysis.

Relationship between Independent Variables and Perceived Need for Change

The number of cases, the means, and standard deviations for each cell are given in Table 31.

TABLE 31

SUMMARY OF PERCEIVED NEED FOR CHANGE MEANS AND STANDARD DEVIATIONS FOR SUPERINTENDENTS WHO DIFFER IN TENURE, SUCCESSION PATTERN AND REFERENCE GROUP ORIENTATION

	Short Tenure				Long Tenure			
	Inside		Outside		Inside		Outside	
	Local	Cos.	Local	Cos.	Local	Cos.	Local	Cos.
Cell	1	2	3	4	5	6	7	8
N	16	6	7	12	16	7	14	16
Mean	447	509	362	697	353	449	570	592
Std. Dev.	275	267	295	289	250	273	291	281

The relationship of tenure, succession pattern and reference group orientation to perceived need for change is shown in Table 32.

TABLE 32

ANALYSIS OF VARIANCE SUMMARY TABLE OF SIGNIFICANCE OF DIFFERENCES IN PERCEIVED NEED FOR CHANGE AMONG SUPERINTENDENTS WHO DIFFER IN TENURE, SUCCESSION PATTERN, AND REFERENCE GROUP ORIENTATION[a]

Source of Variation	Sum of Squares	d.f.	Mean Square	F
A: Tenure	3178.0	1	3178.0	.04
B: Succession Pattern	269535.0	1	269535.0	3.51
C: Orientation	334187.0	1	334187.0	4.36*
AxB: Tenure x Succession	84335.0	1	84335.0	1.10
AxC: Tenure x Orientation	97607.0	1	97607.0	1.27
BxC: Succession x Orientation	49272.0	1	49272.0	0.64
AxBxC: Tenure x Succession x Orientation	151415.0	1	151415.0	1.97
Within:	6596473.0	86	76702.3	
Total	989529.0	93		

*Significant at the .05 level (one-tailed test)
**Significant at the .01 level (one-tailed test)

[a] A multiple linear regression analysis was used to perform the calculations for this table.

The first minor hypothesis predicted that the superintendent's perceived need for change will be greater for short tenure superintendents than for long tenure superintendents. The F-ratio of .04 is not sufficient to reject the null hypothesis. The hypothesis is not supported and it is concluded that tenure is not related to the superintendent's perceived need for change.

The second minor hypothesis stated that the superintendent's perceived need for change will be greater for superintendents who are outsiders than for superintendents who are insiders. Since the F-ratio of 3.51 is not sufficient to reject the null hypothesis, it is concluded that succession pattern does not relate to perceived need for change. The hypothesis is not supported.

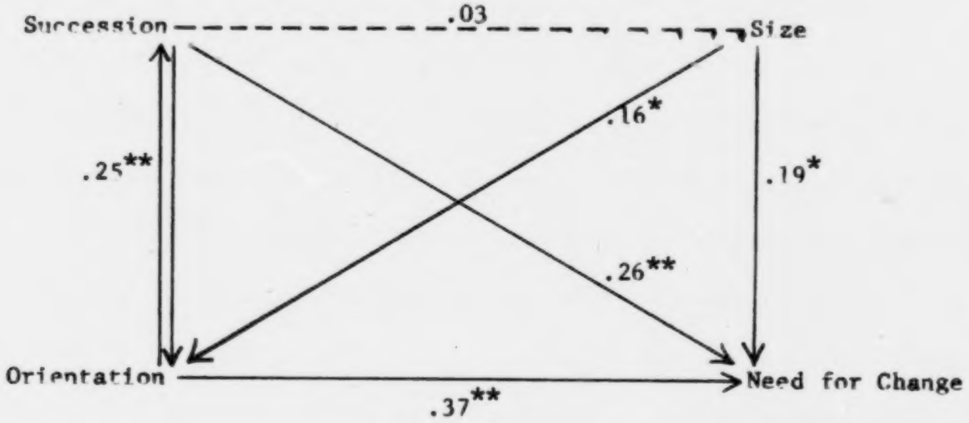
The third minor hypothesis indicated that the superintendent's perceived need for change will be greater if he has a cosmopolitan orientation than if he has a local orientation. The F-ratio of 4.36* is significant at the .05 level. It is concluded that reference group orientation relates to perceived need for change.

The 53 local superintendents had a mean score of 415.3 on the perceived need for change scale and 41 cosmopolitan superintendents had a mean score of 616.8. This difference is in the predicted direction. The hypothesis is confirmed.

Discussion

The simple correlation between tenure and perceived need for change is -.12. The fact that this relationship does not exist is consistent with the earlier finding that the relationship between tenure and innovation was spurious. The simple correlation between the superintendent's age and his perceived need for change is not significant ($r = -.06$). Although it was found in Part I that the superintendent's age and innovation are related, the nature of this relationship can not be attributed to the effect of age upon the superintendent's perceived need for change.

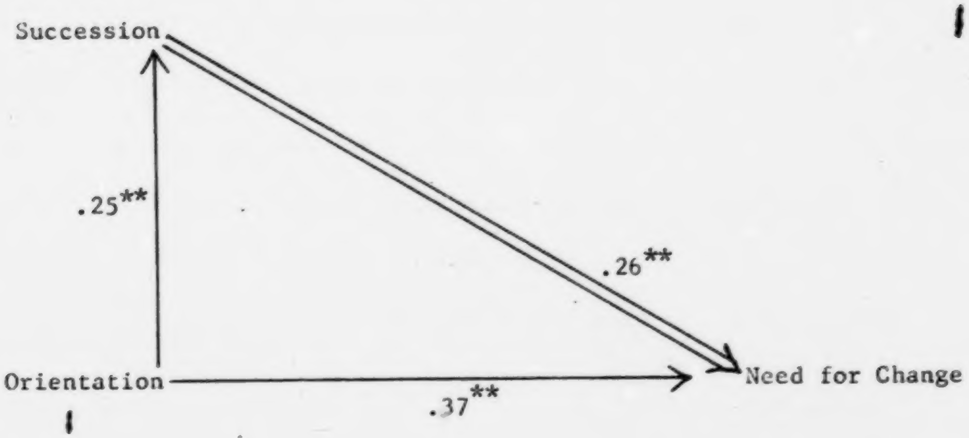
The practice of considering succession pattern, reference group orientation, and size together will be continued in the examination of their relationship with the intervening variables. Figure 18 shows the simple correlations. It may be noted that all relationships except the one between size and succession pattern are significant. This relationship is quite small and does not receive further attention.



SIMPLE CORRELATIONS AMONG SIZE, SUCCESSION PATTERN, REFERENCE GROUP ORIENTATION, AND PERCEIVED NEED FOR CHANGE

FIGURE 18

The simplified model for examining the relationship between succession pattern and perceived need for change is shown in Figure 19. The issue in this case is whether the relationship between succession pattern and perceived need for change is real or an artifact of the relationships between orientation and succession pattern and between orientation and perceived need for change. This was tested by a regression model in which perceived need for change is predicted by both succession pattern and reference group orientation. The results are shown in Table 33.



SIMPLIFIED CAUSAL MODEL
FOR SUCCESSION PATTERN

FIGURE 19

TABLE 33

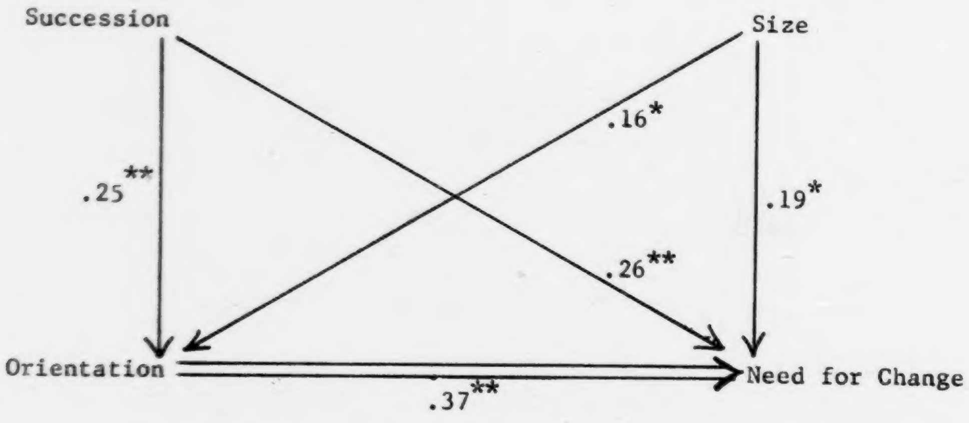
PARTIAL CORRELATIONS FOR THE RELATIONSHIP BETWEEN PERCEIVED NEED FOR CHANGE AND SUCCESSION PATTERN AND REFERENCE GROUP ORIENTATION

Variable	Beta Weight	t-value	Partial r
Succession Pattern	.180	1.82	.19*
Reference Group Orientation	.327	3.31	.33**
Multiple R^2 = .17			

*Significant at the .05 level (one-tailed test)
**Significant at the .01 level (one-tailed test)

The relationship between succession pattern and perceived need for change is .19 (significant at the .05 level) when reference group orientation serves as a control. Thus the relationship is considered real.

The model for considering the relationship between succession pattern and perceived need for change is shown in Figure 20. The appropriate test for determining whether the relationship between reference group orientation and perceived need for change is spurious involves considering size and succession pattern as control variables. The results of this analysis are shown in Table 34.



SIMPLIFIED CAUSAL MODEL FOR ORIENTATION

FIGURE 20

TABLE 34

PARTIAL CORRELATIONS FOR THE RELATIONSHIP BETWEEN PERCEIVED NEED FOR CHANGE AND SIZE, SUCCESSION PATTERN AND REFERENCE GROUP ORIENTATION

Variable	Beta Weight	t-value	Partial r
Size	.132	1.37	.14
Succession Pattern	.182	1.85	.19*
Reference Group Orientation	.305	3.06	.31**
Multiple R^2 = .19			

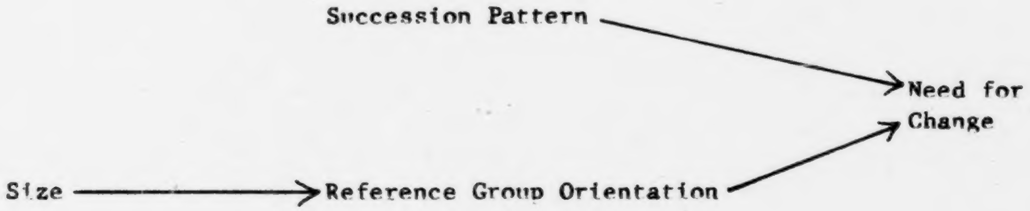
*Significant at the .05 level (one-tailed test)
**Significant at the .01 level (one-tailed test)

The simple correlation of .37 was reduced to .31 when the other two variables were introduced. The reduction is small and the partial correlation is significant; therefore, it is concluded that the relationship is real.

It should be noted that the correlation between size and perceived need for change is reduced from .19 to .14 when succession pattern and reference group orientation are introduced. The latter correlation is not significant.

The reduction in the relationship between size and perceived need for change suggests that orientation may serve as an intervening variable between size and perceived need for change. As an intervening variable, perceived need for change traces the process by which size relates to perceived need for change.

The original model which described the relationship between tenure, succession pattern and reference group orientation on the one hand and perceived need for change on the other has been reformulated. The new formulation is diagrammed in Figure 21.



THE REFORMULATED MODEL FOR
PERCEIVED NEED FOR CHANGE

FIGURE 21

The ability of the reformulated model to describe the way the other variables of the study relate to perceived need for change may be examined by a step-wise regression. In this regression, perceived need for change is the dependent variable and the other variables form the set of independent variables. It is expected that those variables which are not included in the final formulation of the model will be eliminated first. Because of the indirect nature of the relationship of size to perceived need for change, it should be eliminated. Table 35 shows the order in which the variables are eliminated and the t-value from the last regression that included the variabl eliminated.

TABLE 35

VARIABLES ELIMINATED FROM STEP-WISE REGRESSION WITH PERCEIVED NEED FOR CHANGE AS THE DEPENDENT VARIABLE

Order of Elimination	Variable	t-value[a]	loss in predictiveness[b]	remaining predictiveness[c]
first	Board attitude toward change	.113	.0	20.8
second	Age	-.198	.1	20.7
third	Aspiration level	-.138	.0	20.7
fourth	Expenditure	-.832	.6	20.1
fifth	Tenure	-1.275	1.5	18.6
sixth	District Size	-1.373	1.7	16.9

[a] This is the t-value from the last regression prior to the elimination of the variable

[b] This indicates the difference between the percent of the variance explained when the variable is included and when it is not.

[c] This indicates the percent of the variance that is accounted for by the remaining variables in the regression.

The variables not included in Figure 21 were eliminated first. After these variables were eliminated, size was dropped. Both succession pattern and reference group orientation were significant and thus included in the final regression. The partial correlations and associated t-values for these variables are shown in Table 36.

TABLE 36

VARIABLES RETAINED IN A STEP-WISE REGRESSION WITH PERCEIVED NEED FOR CHANGE AS THE DEPENDENT VARIABLE

Variable	Beta Weight	t-value	Partial r
Succession Pattern	.180	1.819	.19*
Reference Group Orientation	.327	3.310	.33**
Multiple R^2 = .17			

*Significant at the .05 level (one-tailed test)
**Significant at the .01 level (one-tailed test)

The results of the step-wise regression indicate that the model shown in Figure 21 explains the data. It also indicates that there are additional undiscovered variables which serve to influence the superintendent's perceived need for change.

Relationship between Independent Variables and Perceived Power to Innovate

The number of cases and the means and standard deviations for each cell are given in Table 37.

TABLE 37

SUMMARY OF PERCEIVED POWER TO INNOVATE MEANS AND STANDARD DEVIATIONS FOR SUPERINTENDENTS WHO DIFFER IN TENURE, SUCCESSION PATTERN AND REFERENCE GROUP ORIENTATION

	Short Tenure				Long Tenure			
	Inside		Outside		Inside		Outside	
	Local	Cos.	Local	Cos.	Local	Cos.	Local	Cos.
Cell	1	2	3	4	5	6	7	8
N	16	6	7	12	16	7	14	16
Mean	499	558	558	539	426	725	340	632
Std. Dev.	155	218	271	297	282	207	261	229

The relationship of tenure, succession pattern, and reference group orientation to perceived power to innovate is shown in Table 38.

The fourth minor hypothesis predicted that the superintendent's perceived power to innovate will be greater for superintendents who are outsiders than for superintendents who are insiders. The F-ratio of .40 is not sufficient to reject the null hypothesis. The hypothesis is not confirmed and it is concluded that succession pattern is not related to the superintendent's perceived power to innovate.

TABLE 38

ANALYSIS OF VARIANCE SUMMARY TABLE OF SIGNIFICANCE OF DIFFERENCES IN PERCEIVED POWER TO INNOVATE AMONG SUPERINTENDENTS WHO DIFFER IN TENURE, SUCCESSION PATTERN, AND REFERENCE GROUP ORIENTATION[a]

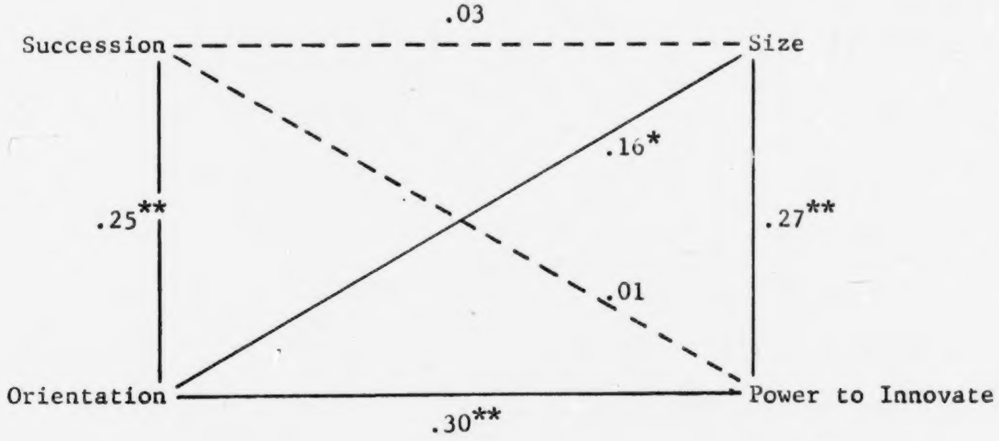
Source of Variation	Sum of Squares	d.f.	Mean Square	F
A: Tenure	1278.0	1	1278.0	.02
B: Succession pattern	23683.0	1	23683.0	.40
C: Orientation	501288.0	1	501288.0	8.42**
AxB: Tenure x Succession	60706.0	1	60706.0	1.02
AxC: Tenure x Orientation	382303.0	1	382303.0	6.42**
BxC: Succession x Orientation	9153.0	1	9153.0	.15
AxBxC: Tenure x Succession x Orientation	6195.0	1	6195.0	.10
Within:	5118428.0	86	59516.6	
Total	984606.0	93		

*Significant at the .05 level (one-tailed test)
**Significant at the .01 level (one-tailed test)

[a] A multiple linear regression analysis was used to perform the calculations for this table.

Discussion

The simple correlation between tenure and perceived power to innovate is .09. This is consistent with the earlier finding that the relationship between tenure and innovation was spurious. The correlation between the superintendent's age and his perceived power to innovate is not significant ($r = -.02$). As in the case of perceived need for change, the nature of the relationship between age and innovation can not be explained by the effect of age upon the superintendent's perceived power to innovate. Figure 22 shows the simple correlations among succession pattern, size, reference group orientation, and perceived power to innovate.

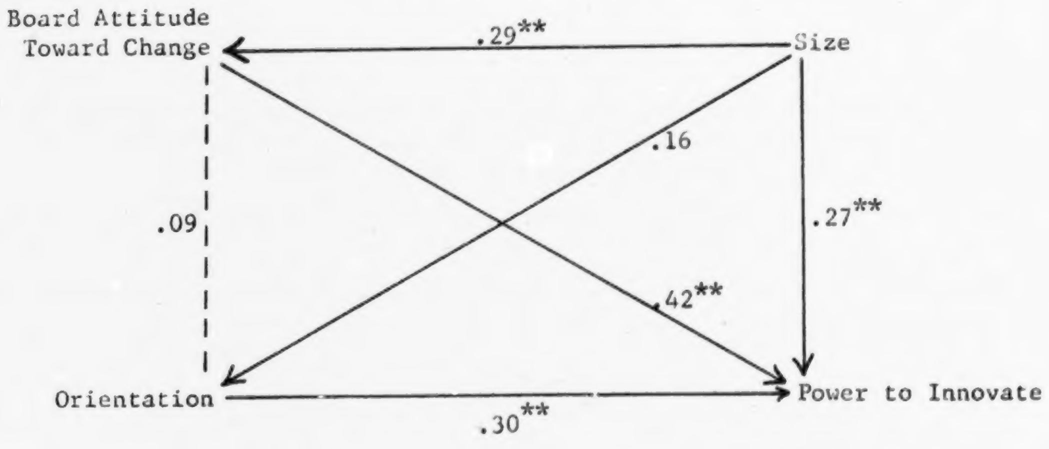


SIMPLE CORRELATIONS AMONG SIZE, SUCCESSION PATTERN,
REFERENCE GROUP ORIENTATION, AND
PERCEIVED POWER TO INNOVATE

FIGURE 22

Since succession pattern does not relate to perceived power to innovate it is dropped from further consideration in the analysis of perceived power to innovate.

The simple correlation matrix presented in Table 27 (see page 89) indicates that board attitude toward change correlates .42 (significant at the .01 level) with perceived power to innovate. The size of this relationship indicates that it should receive further attention. Board attitude toward change replaces succession pattern in Figure 23 and is considered with size and reference group orientation.



SIMPLE CORRELATION AMONG SIZE, REFERENCE GROUP ORIENTATION, BOARD ATTITUDE TOWARD CHANGE AND PERCEIVED POWER TO INNOVATE

FIGURE 23

Table 39 presents the results of a regression that includes board attitude toward change, reference group orientation, and size. The correlation between board attitude toward change (as perceived by the superintendent) and perceived power to innovate is reduced from .42 to .37 (significant at the .01 level). It is concluded that this relationship is real. The correlation between reference group orientation and perceived power to innovate is reduced from .30 to .27 (significant at the .01 level). It is concluded that this relationship is also real.

The simple correlation of .27 between district size and perceived power to innovate is decreased to .13 when the other two variables are included. The partial correlation is not significant. It is concluded that board attitude toward change and the superintendent's reference group orientation serve as intervening variables which trace the manner in which size affects perceived power to innovate.

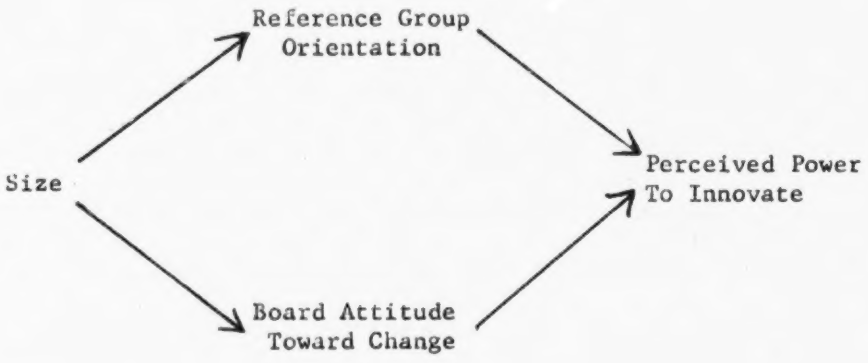
TABLE 39

PARTIAL CORRELATIONS FOR THE RELATIONSHIP BETWEEN PERVEIVED POWER TO INNOVATE AND SIZE, REFERENCE GROUP ORIENTATION, AND BOARD ATTITUDE TOWARD CHANGE

Variable	Beta Weight	t-value	Partial r
Size	.119	1.24	.13
Reference Group Orientation	.249	2.71	.27**
Board Attitude Toward Change	.364	3.84	.37**
Multiple R^2 = .26			

*Significant at the .05 level (one-tailed test)
**Significant at the .01 level (one-tailed test)

The original model used to describe the relationship between the independent variables and perceived power to innovate has been altered as shown in Figure 24.


Reference Group Orientation
Size
Perceived Power To Innovate
Board Attitude Toward Change

THE ALTERED MODEL FOR PERCEIVED POWER TO INNOVATE

FIGURE 24

In Figure 24, it may be noted that perceived power to innovate is a function of two relationships not included in the original formulation of the model. Two concepts, the superintendent's reference group orientation and the board's attitude toward change, relate significantly to perceived power to innovate.

The ability of the reformulated model to describe the way the other variables of the study relate to perceived power to innovate is examined by a step-wise regression. In this regression, perceived power to innovate is the dependent variable and the other variables form the independent variables. It is expected that those variables which are not included in the final formulation of the model will be eliminated first. Because of the indirect nature of the relationship between size and perceived power to innovate, it should be eliminated. Table 40 shows the order in which the variables are eliminated and the t-value from the last regression that included the variable eliminated.

Five variables were eliminated from the step-wise regression. Three significant variables were retained in the final regression. The partial correlations and associated t-values for these variables are shown in Table 41. Reference group orientation and board attitude toward change were retained in the regression as expected. The third variable that relates to the superintendent's perceived power to innovate is district expenditure level. The model for perceived power to innovate (Figure 25) shows a reformulated model which includes expenditure level as a determinant of perceived power to innovate.

TABLE 40

VARIABLES ELIMINATED FROM STEP-WISE REGRESSION WITH PERCEIVED POWER TO INNOVATE AS THE DEPENDENT VARIABLE

Order of Elimination	Variable	t-value[a]	loss in predictiveness[b]	remaining predictiveness[c]
first	Succession Pattern	- .212	.1	31.7
second	Aspiration level	-1.232	1.2	30.5
third	Age	-1.226	1.2	29.3
fourth	Tenure	1.063	.9	28.4
fifth	District size	1.296	1.3	27.1

[a] This is the t-value from the last regression prior to the elimination of the variable

[b] This indicates the difference between the percent of the variance explained when the variable is included and when it is not

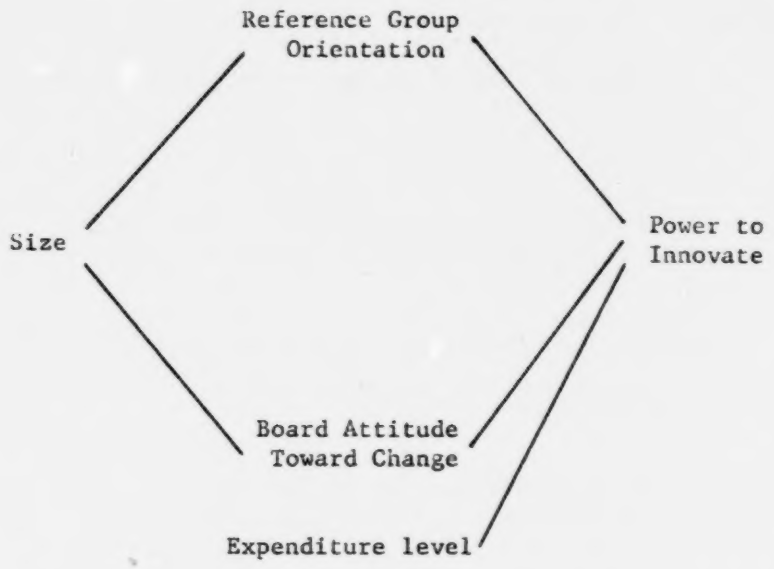
[c] This indicates the percent of the variance that is accounted for by the remaining variables in the regression

TABLE 41

VARIABLES RETAINED IN A STEP-WISE REGRESSION WITH PERCEIVED POWER TO INNOVATE AS THE DEPENDENT VARIABLE

Variable	Beta Weight	t-value	Partial r
Expenditure	.009	-1.68	- .17*
Board Orientation	.008	4.22	.41**
Reference Group Orientation	.009	3.25	.32**

Multiple $R^2 = .27$



THE REFORMULATED MODEL FOR PERCEIVED POWER TO INNOVATE

FIGURE 25

Since board attitude toward change and expenditure level were not incorporated in the original model or in the rationale presented in Chapter II, consideration should be given to the way in which they effect perceived power to innovate.

When the board of education's attitude toward change is favorable, the superintendent has a higher perceived power to innovate. This relationship is rather straight forward. The superintendent serves at the pleasure of the board. Thus, the board has a very real power over the superintendent. The board may also influence decisions through its control over policies, budgets, buildings, and materials.

A low district expenditure level serves to limit innovation. The earlier study by Reynolds (1965) demonstrated that innovation is inhibited when expenditure is less than $400 or $450 per pupil. The adoption of many of the innovations sampled in this study involve increased district costs.

Part 3: Relationship Between Intervening and Dependent Variables

The expected relationship between the intervening variables and the dependent variable is stated as follows:

> The level of innovation is expected to be greater when the superintendent has a high perceived need for change and a high perceived power to innovate than when the superintendent has either a low perceived need for change or a low perceived power to innovate, or both.

The hypothesis stated above replaces three minor hypotheses of the earlier study by Reynolds (1965, p. 35). The reformulated hypothesis more adequately reflects the idea that perceived need for change and perceived power to innovate are both necessary conditions for the occurrence of innovation and that neither is a sufficient condition.

Table 42 presents the number of cases and the means and standard deviations for four groups of superintendents who differ in perceived need for change and perceived power to innovate. The mean innovation scores for groups 1, 2, and 3 do not differ markedly. A t-test of the difference between means indicated that none of the differences were significant. This finding justifies combining the three groups.

The hypothesis predicts that superintendents who have high scores on both measures, perceived need for change and perceived power to innovate, will have a higher innovation ratio than superintendents who do not have a high score on both measures. The t-value of 2.58 (see Table 43) is significant at the .01 level and thus sufficient to reject the null hypothesis of no significant difference between the means. The hypothesis was confirmed and it was concluded that the level of innovation is greater when the superintendent has a high perceived need for change and a high perceived power to innovate.

TABLE 42

INNOVATION MEANS FOR SUPERINTENDENTS WHO DIFFER IN PERCEIVED NEED FOR CHANGE AND PERCEIVED POWER TO INNOVATE

	Low Need for Change		High Need for Change	
	Low Power	High Power	Low Power	High Power
N	22	23	20	29
Mean	94.3	98.8	105.3	133.5
Std. Dev.	48.5	63.6	40.2	73.8

TABLE 43

RESULTS OF T-TEST FOR DIFFERENCE BETWEEN MEAN INNOVATION SCORES FOR GROUPS 1, 2 AND 3 AND GROUP 4

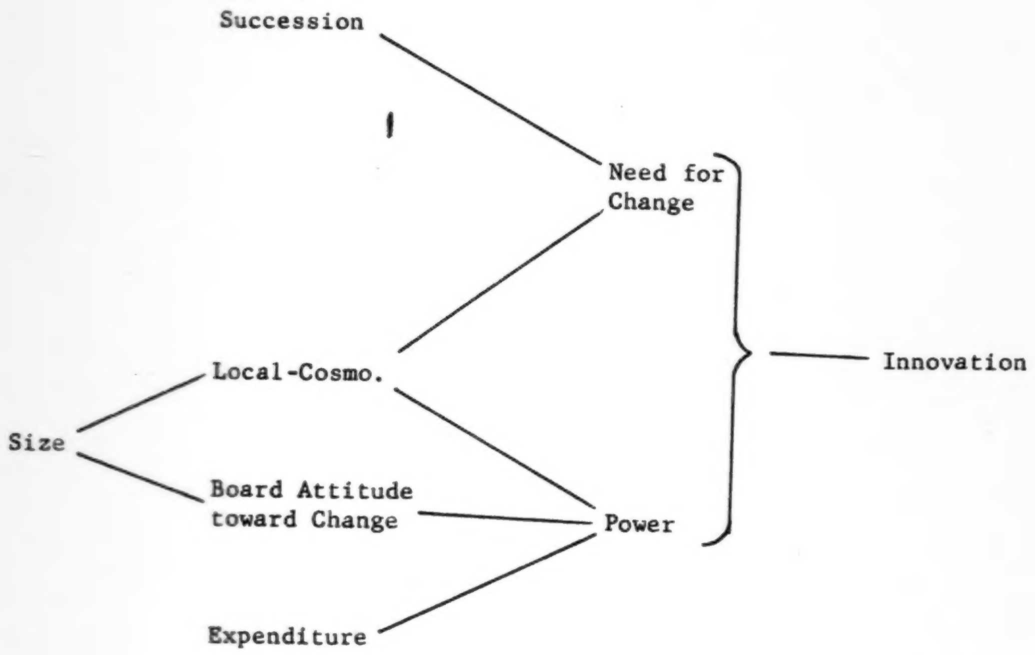
	N	Mean	T-Value
Groups 1, 2, 3	65	99.3	2.58**
Group 4	29	133.5	

**Significant at the .01 level (one-tailed test)

Group 1 = Low Perceived Need for Change; Low Power to Innovate
Group 2 = Low Perceived Need for Change; High Power to Innovate
Group 3 = High Perceived Need for Change; Low Power to Innovate
Group 4 = High Perceived Need for Change; High Power to Innovate

The Reformulated Model

The findings relative to the superintendent's analysis are summarized graphically in Figure 26 which more adequately explains the data than the original formulation presented at the beginning of the chapter. This model combines the relationships considered in this chapter into a single model.



THE REFORMULATED INNOVATION MODEL

FIGURE 26

It may be noted that the superintendent's age was found to relate to innovation but that it is not included in the reformulated model. Age was not related to either perceived need for change or perceived power to innovate. It is concluded that age relates to one or more unidentified intervening variables.

CHAPTER VI

THE JOINT ANALYSIS

This chapter is concerned with an examination of the total amount of variance in secondary and elementary innovation that can be explained by three sets of variables. The three sets relate to: (a) the superintendent, (b) the principal, and (c) the district. This part of the study is exploratory in nature and does not include the testing of hypotheses. The relative contribution of the three sets of variables will assist in determining the most appropriate unit of analysis for studying innovation.

Consideration is also given to the total amount of variance in elementary and secondary innovation that can be explained by the variables measured in the study. This will include identifcation of the relative contribution made by each variable. It will also help to determine the degree to which the concepts tenure, succession pattern, and reference group orientation are useful in considering innovation rates.

The nature of the joint analysis required modification in both the tenure and innovation measures. These modifications are outlined in the following section.

Methodological Considerations

Two joint analyses were performed. The first was a joint secondary analysis which considered data related to the superintendent and the secondary principal and a joint elementary analysis which considered data related to the superintendent and the elementary principal. Two new dependent variables, joint secondary innovation-ratio and joint elementary innovation-ratio, were developed.

The joint innovation-ratios, like the innovation-ratios described earlier, were based upon the number of innovations divided by the number of innovations possible. The result was multiplied by 1000 to eliminate the decimal. Since data concerning the innovations adopted during a four year period had been collected, the maximum base period used in the calculating of the innovation-ratio was four years. The first year of tenure for a superintendent or principal was excluded because there was no way of determining whether he or his predecessor was responsible for the adoption of a new practice. When the tenure of either the superintendent or principal (after elimination of the first year) was less than four years a shorter time period was used in calculating the innovation-ratio.

The joint secondary innovation scores have a range of 000 to 500, a mean of 124.8, and a standard deviation of 91.0. The joint elementary innovation scores have a range of 000 to 625, a mean of 111.8, and a standard deviation of 97.5. The joint secondary analysis includes 101 schools and the joint elementary analysis, 98 schools.

The change in the base period for calculating innovation-ratios made it necessary to recalculate average tenure scores for superintendents and principals. The tenure score represents the administrator's average tenure during the period considered.

Multiple correlation was used to determine the amount of variance in the dependent variable that could be explained by various sets of independent variables. This procedure weights the independent variables to maximize the correlation with the dependent variable (joint secondary innovation ratio or joint elementary innovation ratio).

The partial correlation coefficient and the associated t-value were used to determine the significance of individual variables in the sets. The partial correlation coefficient indicates the relationship between an independent variable and dependent variable when the effect of the other independent variables in the set is removed.

Analysis and Discussion

The analysis reported in this chapter will be divided into two major parts. The first pertains to the joint secondary analysis and the second, to the joint elementary analysis. Each analysis includes an investigation of the comparative amount of variance that can be explained by three attributes of the superintendent; tenure, succession pattern, and reference group orientation; and by the same attributes of the principal. Attention will also be given to the total amount of variance in secondary and elementary innovation that can be explained by all of the variables of the study.

Joint Secondary Analysis

Table 44 shows the results of a regression analysis in which the superintendent's tenure, succession pattern, and reference group orientation represent the independent variables and joint secondary innovation, the dependent variable. A similar regression for secondary principals is given in Table 45. A regression involving the 3 variables relating to the superintendent and the 3 variables relating to the secondary principal is presented in Table 46.

TABLE 44

THE VARIANCE IN SECONDARY INNOVATION EXPLAINED BY THREE VARIABLES RELATED TO THE SUPERINTENDENT

Variable	Beta Weight	t-value	Partial r
Superintendent's tenure	.039	.40	.04
Superintendent's succession	.174	1.72	.17*
Superintendent's reference group orientation	.173	1.71	.17*
Multiple R^2 = .07			

*Significant at the .05 level (one-tailed test)

TABLE 45

THE VARIANCE IN SECONDARY INNOVATION EXPLAINED BY THREE VARIABLES RELATED TO THE PRINCIPAL

Variable	Beta Weight	t-value	Partial r
Principal's tenure	-.120	-1.31	-.13
Principal's succession	.130	1.41	.14
Principal's reference group orientation	.380	4.09	.38**
Multiple R^2 = .19			

**Significant at the .01 level (one-tailed test).

TABLE 46

THE VARIANCE IN SECONDARY INNOVATION EXPLAINED BY 3 VARIABLES ASSOCIATED WITH THE SUPERINTENDENT AND 3 VARIABLES ASSOCIATED WITH THE PRINCIPAL

Variable	Beta Weight	t-value	Partial r
Superintendent's tenure	.050	.56	.06
Superintendent's succession	.202	2.16	.22*
Superintendent's reference group orientation	.136	1.46	.15
Principal's tenure	-.164	-1.80	-.18*
Principal's succession	.111	1.21	.12
Principal's reference group orientation	.372	4.08	.39**

Multiple $R^2 = .26$

*Significant at the .05 level (one-tailed test)
**Significant at the .01 level (one-tailed test)

Seven per cent of the variance in the joint innovation ratio is explained by the 3 attributes of superintendents. Nineteen per cent of the variance is explained by the 3 attributes of the secondary principal. This indicates that the effect of the principal upon secondary innovation is greater than the effect of the superintendent. It must, of course, be recognized that this conclusion is based upon a consideration of only 3 of many possible characterists of superintendents and principals. If another set of variables was considered, the conclusion might be different.

The two sets of variables together account for 26 per cent of the variance (see Table 46). The 19 per cent and 7 per cent accounted for by the principal and superintendent respectively are almost totally independent of each other.

Data were collected concerning 3 characteristics associated with the district: expenditure level, district size (indicated by the number of teachers), and secondary or elementary school size. Table 47 presents the results of a regression involving these variables. The three variables collectively account for 11 per cent of the variance. District size accounts for most of this variance.

The fact that 3 variables associated with the district account for 11 per cent of the variance indicates that models of innovation must include consideration of district characteristics. Size has been identified as one of the important district characteristics. Contrary to some other studies, expenditure was not found to be an important determinant of innovation.

TABLE 47

THE VARIANCE IN SECONDARY INNOVATION EXPLAINED BY 3 VARIABLES ASSOCIATED WITH THE DISTRICT

Variable	Beta Weight	t-value	Partial r
Expenditure	.006	.06	.01
District Size	.360	3.06	.30**
Building Size	-.060	-.51	- .05

Multiple R^2 = .11

**Significant at the .01 level (two-tailed test)

Table 48 shows the amount of the variance in secondary innovation that is explained by each of the 3 groups of variables. Since the 3 groups are not totally independent of each other the variance explained by the 9 variables (34%) in a single analysis is less than the sum of the amounts for the three groups considered separately (37%). Because the differences are small, it is concluded that the sets are relatively independent of each other.

TABLE 48

PERCENT OF THE VARIANCE IN SECONDARY INNOVATION EXPLAINED BY 3 SETS OF VARIANCE

Class of Variables	Percent of Variance Explained
District Variables	11%
Superintendent Variables	7%
Principal Variables	19%

The variables associated with the secondary principal proved to be more useful in explaining innovation in secondary schools than those associated with the district or the superintendent. Because the latter two groups of variables contribute in explaining secondary innovation, it is concluded that all three categories of variables will be needed in a complete model of the change process.

Attention is now given to the amount of the variance in secondary innovation that can be accounted for by 16 variables. The four variables (see Table 49) that have significant partial correlations explain 31.5% of the variance in secondary innovation. All 16 variables account for 40.6% of the variance.

TABLE 49

SECONDARY INNOVATION PREDICTED BY 16 VARIABLES

Variable	Partial r[a]	Cumulative % of Variance Accounted for
Principal's Reference Group Orient.	.31**	
District Size	.30**	
Superintendent's Succession Pattern	.23*	
Supt.'s Perception of Board Attitude Toward Change	.18*	31.5
Principal's Succession Pattern	.18	33.9
Principal's Tenure	-.13	35.7
Superintendent's Perceived Need for Change	.17	37.2
Superintendent's Age	-.18	38.5
Building Size	-.11	39.1
Principal's Perception of Supt.'s Attitude Toward Change	-.09	39.4
Superintendent's Reference Group Orientation	.07	39.7
Superintendent's Aspiration Level	-.07	40.1
Superintendent's Tenure	.05	40.4
Superintendent's Perceived Power to Innovate	.05	40.5
Principal's Age	.05	40.6
Expenditure Level	.02	40.6

*Significant at the .05 level (one-tailed test)
**Significant at the .01 level (one-tailed test)

[a] This represents the partial correlation for the full regression which includes 16 variables.

Joint Elementary Analysis

The results of a regression analysis in which the superintendent's tenure, succession pattern and reference group orientation represent the independent variables and joint elementary innovation represents the dependent variable are shown in Table 50.

Three per cent of the variance in the joint elementary innovation ratio is explained by the three variables related to the superintendent. It may be noted that none of the variables is significantly related to joint elementary innovation. Table 51 shows the results of a regression analysis which includes the elementary principal's tenure, succession pattern and reference group orientation as independent variables and joint elementary innovation as the dependent variable. The three variables in combination explain ten per cent of the variance in elementary innovation. Only one of the variables, the principal's tenure, is significantly related to the level of innovation in the elementary school.

TABLE 50

THE VARIANCE IN ELEMENTARY INNOVATION EXPLAINED BY THREE VARIABLES RELATED TO THE SUPERINTENDENT

Variable	Beta Weight	t-value	Partial r
Superintendent's Tenure	-.074	- .72	-.07
Superintendent's Succession	.148	1.40	.14
Superintendent's Reference Group Orientation	.031	.29	.03

Multiple $R^2 = .03$

TABLE 51

THE VARIANCE IN ELEMENTARY INNOVATION EXPLAINED BY THREE VARIABLES RELATED TO THE PRINCIPAL

Variable	Beta Weight	t-value	Partial r
Principal's tenure	-.262	-2.69	-.27**
Principal's succession	.141	1.43	.15
Principal's reference group orientation	.087	.89	.09

Multiple $R^2 = .10$

**Significant at the .01 level (one-tailed test)

The three variables related to the superintendent and the three variables relating to the principal have been combined into a single regression. The results of this combination are shown in Table 52. The two sets of variables are almost totally independent of each other. Therefore, the total amount of variance explained when the six are included in a single regression is equal to the sum of the separate amounts of variance explained. Table 53 shows the results of a regression analysis in which three attributes of the district serve as the independent variables. These variables are expenditure level, district size, and elementary school size. These three variables jointly account for three per cent of the variance in the joint elementary innovation ratio. None of the variables bears a significant relationship to the elementary innovation ratio.

TABLE 52

THE VARIANCE IN ELEMENTARY INNOVATION EXPLAINED BY 3 VARIABLES ASSOCIATED WITH THE SUPERINTENDENT AND 3 VARIABLES ASSOCIATED WITH THE PRINCIPAL

Variable	Beta Weight	t-value	Partial r
Superintendent's tenure	-.115	-1.13	-.12
Superintendent's succession	.142	1.44	.15
Superintendent's reference group orientation	.003	.03	.00
Principal's tenure	-.260	-2.65	-.27**
Principal's succession	.142	1.44	.15
Principal's reference group orientation	.114	1.11	.12

Multiple $R^2 = .14$

**Significant at the .01 level (one-tailed test)

TABLE 53

THE VARIANCE IN ELEMENTARY INNOVATION EXPLAINED BY 3 VARIABLES ASSOCIATED WITH THE DISTRICT

Variable	Beta Weight	t-value	Partial r
Expenditure	.161	1.56	.16
District Size	.065	.64	.07
Building Size	-.017	- .17	-.02

Multiple $R^2 = .03$

Table 54 shows the amount of the variance in elementary innovation that is explained by each of the three groups of variables.

TABLE 54

PERCENT OF THE VARIANCE IN ELEMENTARY INNOVATION EXPLAINED BY 3 SETS OF VARIABLES

Class of Variables	Percent of Variance Explained
District Variables	3%
Superintendent Variables	3%
Principal Variables	10%

The variables associated with the elementary principal proved to be more useful in explaining innovation in elementary schools than those associated with the district or the superintendent. Although the amount of variance explained by the two latter sets of variables is small, it is felt that they may prove useful in a model of the change process. Additional research may identify attributes of the superintendent or the district that have greater power to explain the rate of change in elementary schools.

Attention is now given to the amount of the variance in elementary innovation that can be accounted for by 16 variables. The results of a regression in which joint elementary innovation serves as the dependent variable and the other 16 variables of the study serve as independent variables is shown in Table 55. Only one of the 16 variables is related significantly to elementary innovation. This variable, principal's tenure,

TABLE 55

ELEMENTARY INNOVATION PREDICTED BY 16 VARIABLES

Variable	Partial r[a]	Cumulative % of Variance Accounted for
Principal's Tenure	-.20*	7.0
Superintendent's Age	-.12	9.6
Superintendent's Succession Pattern	.13	12.5
District Size	.16	14.5
Principal's Succession Pattern	.13	16.2
Expenditure Level	.14	17.7
Superintendent's Reference Group Orientation	-.11	18.2
Principal's Reference Group Orient.	.11	18.7
Principal's Age	-.10	19.2
Superintendent's Tenure	-.08	19.7
Superintendent's Perception of Board Orientation	-.10	20.2
Building Size	-.06	20.6
Superintendent's Perceived Power to Innovate	.07	20.9
Superintendent's Perceived Need for Change	.06	21.2
Principal's Perception of Superintendent's Attitude Toward Change	.04	21.4
Superintendent's Aspiration Level	.00	21.4

*Significant at the .05 level (one-tailed test)

[a] This represents the partial correlation for the full regression which includes 16 variables.

correlates -.20 with innovation (significant at the .05 level). When the 16 variables are considered together, they account for 21.4 per cent of the variance in the dependent variable.

CHAPTER VII

DISCUSSION

This chapter will attempt to view a number of issues raised in the opening chapter. These issues relate to:

a) the ability of the concepts included in the study to contribute to an innovation model

b) the appropriateness of the reformulated model for examining building innovation

c) determination of whether the building or district serves as the most appropriate unit of analysis for investigating innovation

d) the relative importance of the superintendent and principal in determining the rate of innovation

e) conclusions

The Individual Concepts

This portion of the discussion is concerned with a consideration of each of the concepts of the study. Each is considered across the three innovation levels.

Tenure

The rationale for the study (see page 24) stated the expected relationship between tenure and innovation as follows:

> The administrator of long tenure is expected to see less need for change than the administrator of short tenure because he has often played an important part in the formulation of the existing program and may therefore have a greater commitment to it. His involvement in the interpersonal structure and his loyalty to the school system and its traditions are also expected to be greater and thus to further diminish his perception of the need for change.

The findings relative to tenure differ for the 3 analyses. For the secondary principal the relationship was not found; for the elementary principal tenure was significant; and for the superintendent it was significant, but was later shown to be spurious. The expected relationship between tenure and perceived need for change did not exist.

In general, the findings do not support the rationale. If long and short tenure administrators relate to the organization differently, it is in ways that do not influence innovation in a systematic fashion. Two findings do, however, suggests that tenure receive further attention in the development of models that attempt to explain innovation. The first is the relationship which was found for elementary principals, and the second is in the interaction between tenure and succession in the superintendent's analysis.

Age

Consideration of the effect of tenure led to an examination of the relationship between age and innovation. It was shown that a significant correlation was present for elementary principals and for superintendents. A similar relationship was not found for secondary principals. If it were not for the small correlation between age and perceived need for change (-.06) it might be argued that administrators become more conservative as they get older and therefore see less need for change.

The adoption of a new practice includes an element of risk taking. Those who initiate change run the risk of failure. The way in which the age of the administrator affects innovation may relate to differences in the willingness of older and younger administrators to take risks. The psychological attributes of older persons may not be conducive to risk taking. An older administrator often has more at stake because he often has a better job and a higher salary, he may have more to lose than the younger man. His personal responsibilities may also be greater, thus increasing his desire for security. The higher level of attainment also tends to limit the number of equal positions available to him.

There is often a lot of work involved in initiating a new program. The younger administrator may be more likely to have the necessary initiative and physical energy to engage in the development of new programs.

It is also possible that age effects the way the administrator is perceived by others. Superintendents and principals have an important influence upon the climate for change in a district or building. Older administrators may be perceived by other staff members as being less oriented toward change. This may be more a function of a stereotype which associated age with conservatism than of a real difference. In either case, others in the system may initiate change less often when the administrator is older. It was found that the age of the superintendent and the principal's perception of his attitude toward change were negatively correlated ($r = -.21$, significant at the .05 level).

Succession

The rationale (see page 27) stated the expected relationship between succession as follows:

> The outside successor may at least during the early stages of the succession cycle see a greater need for change because, like the administrator of short tenure, he will not have played a significant part in the development of the program of the school system. The outsider's knowledge of the program in another district provides him with a basis of comparison. A belief in the program

> of his former district may result in a desire to implement that program in his present district. He will also have little involvement in the interpersonal structure. The outsider may not only have little commitment to the traditions but may even lack knowledge of them.
>
> The outsider is expected to have during the first few years of his tenure, a greater sense of power to innovate than the insider. Carlson said that there are different conditions of employment and differential expectations for insiders and outsiders (Carlson, 1961, p. 226). The insider is hired with the understanding that he will keep things as they are, while the outsider may be expected to make changes. The difference in expectations arises from differential satisfactions with the previous administration; i.e., when the board is satisfied it may employ either an insider or an outsider, but when it is dissatisfied it will turn to an outsider.

The succession pattern of the superintendent and the secondary principal were found to relate to the level of innovation. The findings relative to the elementary principal were in the predicted direction, but were not significant.

The superintendent's succession pattern was related to his perceived need for change, but was not related to his perceived power to innovate. These findings support the rationale, i.e., outside successors are associated with higher levels of innovation because they perceive a greater need for change.

Reference Group Orientation

The rationale of the study discussed the expected relationship between reference group orientation and innovation as follows:

> The administrator who has a cosmopolitan reference group orientation is expected to see a greater need for change because of an increased awareness of alternatives to the existing program. This is expected to occur as a result of greater interest in events outside the local school system. His orientation will bring him into earlier contact with ideas as a result of more extensive reading and

> more frequent personal contact with persons external to the local system.
>
> Because the cosmopolitan is more concerned with a reference group outside his immediate environment, he may have less local involvement and therefore be less concerned about keeping things "as they are." The cosmopolitan may seek an increase in status within the profession through the visibility acquired by the initiation of "new" programs. Persons outside the local district will be more impressed by the initiation of new programs than by the effective administration of the existing program (see page 28).

The simple correlations between the reference group orientation of the administrator and the level of innovation was found to be significant at the .01 level for elementary and secondary principals and for superintendents. In the case of the secondary principal, the correlation remained significant when the effect of the other variables was partialed out.

Superintendents with cosmopolitan reference group orientations see themselves as having greater power to innovate than superintendents with local reference group orientations. Locals and cosmopolitans probably have different perceptions of the nature and extent of the resistance that exists within the community and within the school system. Locals see less need for change and probably tend to associate with others of like views. Cosmopolitans, on the other hand, are probably more aware of the feelings of other cosmopolitans. If this pattern of association exists, it may cause the local to overestimate the resistance to change and thus to underestimate his own potential for introducing innovations. Cosmopolitans, by contrast, may underestimate the resistance and overestimate their power.

The difference between locals and cosmopolitans may not be limited to their perceptions of the situation. They may also behave differently under the same circumstances. Both groups of administrators probably consider the personal consequences of influence attempts. For the local, these consequences are viewed in terms of the reaction of persons within the school system and in terms of the local community. Their concern with local reactions is likely to cause them to be less willing to effect changes that will create conflict.

Cosmopolitans, on the other hand, are less likely to demand consensus before acting. They are more likely to view their power in terms of final results. Even though the attainment of these results may involve conflict, it is thought that they will be more willing to bring the full powers of their position to bear upon the problem.

Size

The size of the school district was found to be significantly related to secondary and district innovation. It did not relate to elementary innovation. When the objective is to find the relationship between attributes of the principal or superintendent and innovation, size may be considered a contanimate. However, when the purpose is to develop an innovation model, size becomes one of the concepts that should be included.

The size of the school district relates to many other aspects of the district. The way it influences innovation is, in part, shown in the reformulated model. Large districts tend to have more cosmopolitan superintendents and boards which have a more positive attitude toward change. These relationships do not account for the full impact of size upon innovation. As more inclusive models are developed, district size should receive further attention.

Size may serve as an indirect measure of the degree of urbanization. Larger school districts tend to be located in urban centers. It is possible that large and small school districts near these centers occupy a different position in the flow of communication about new practices. Information about new practices is more likely to be passed from one district to another in these districts. The opportunity for contact with new ideas eminating from colleges and universities may also be greater. It is also expected that commercial agencies will give greatest attention to the larger districts. This increases information about alternatives to the existing program.

The size of the district is probably related to the characteristics of the professional staff. Larger districts may have more highly trained personnel. Size may also effect the assignment of personnel in the district. Large districts are more likely to have specialists who are familar with new programs in their area. The availability of such people not only increases the probability of a district being aware of a new practice, but also provides the expertise needed for adopting some of the more sophisticated innovations.

The size of the district relates to the feasibility of adopting some of the innovations included in this study. I.B.M. scheduling and grade reporting, for example, are probably not practical for a small school district.

Board Attitude Toward Change

Board attitude toward change was found to be a useful concept in explaining the innovative behavior of a school district. The board of education's power to exercise control over policies, budgets, and personnel make it possible to control the nature and extent of change. The board's authority serves to limit the administrator's power to innovate.

The magnitude of the board's influence cannot be fully determined by examining the number of innovations they reject. Superintendents seldom propose innovations that they think will be rejected. To propose an innovation and have it rejected results in a loss of power and influence for the advocate (see page 21).

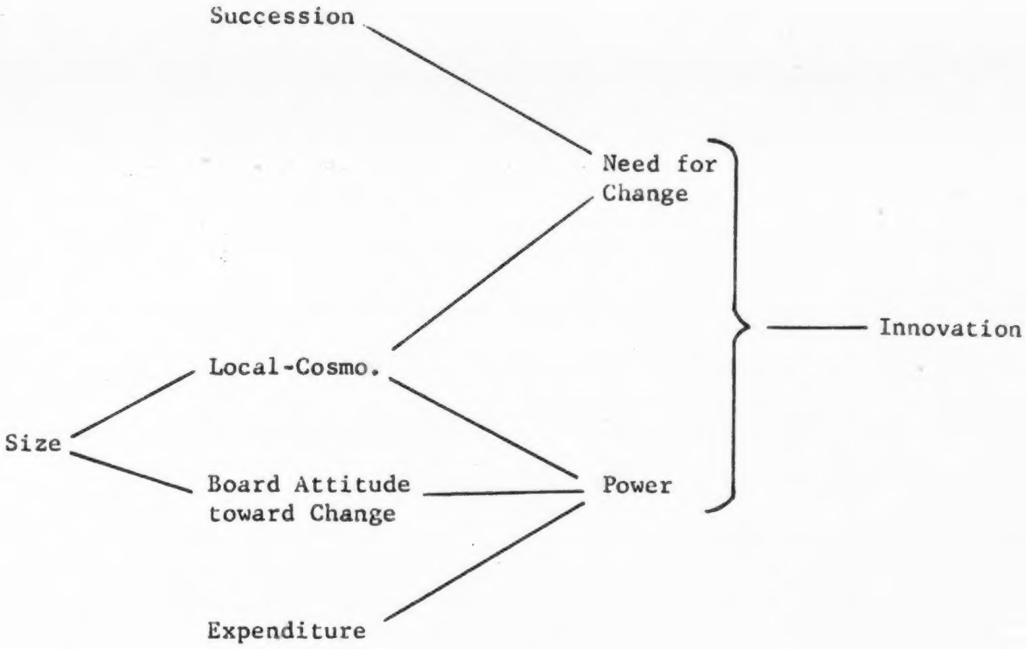
Expenditure Level

The expenditure level deserves consideration in models of innovation. Low expenditure serves to inhibit innovation, however high expenditure does not guarantee innovation. When expenditures are low, some types of innovation are not feasible. A number of innovations included in this study involved increased cost.

Expenditure may also have a less direct effect upon innovation. It is reasonable to expect that districts which are faced with major financial difficulties or problems associated with rapid growth may be so concerned with these problems that there is little time to consider innovation.

The intervening variables, perceived need for change and perceived power to innovate, were found to relate significantly to both the independent and the dependent variables. The rationale for the study stated that perceived need for change and perceived power to innovate are necessary, but not sufficient conditions, for the occurance of innovation. The findings of the study support this.

The original model was reformulated to include the additional variables found to be important. The relationships are diagrammed in Figure 27.



THE REFORMULATED INNOVATION MODEL

FIGURE 27

The Model and Building Innovation

The analysis of secondary and elementary innovation was designed to determine whether or not the model that relates attributes of the superintendent to district innovation could be extended to the principal and building innovation. This question is considered in relation to the reformulated model for district innovation (see Figure 27).

The succession pattern and reference group orientation of secondary principals was found to relate to innovation. District size was also found to be associated with secondary innovation. The relationships that were found for secondary principals are similar to those found for superintendents. The only exception is age which was found to be important for superintendents, but not for secondary principals.

The findings pertaining to the principal's tenure, succession pattern and reference group orientation are similar to those for the superintendent. Although the intervening variables were not measured for the principals; it is reasonable to expect that they, like the independent variables, would have been found to relate in a manner similar to that found for superintendents. It now seems reasonable to conclude that the reformulated model and the associated rationale is applicable to secondary principals.

In the case of elementary innovation, the principal's succession pattern and reference group orientation were not found to relate significantly to innovation. Reference group orientation was significant in the step-wise regression, but not in the other analyses and succession pattern was not significant.

The failure of succession pattern and reference group orientation to relate more strongly to innovation may result from either a lack of relationship between these variables and the intervening variables or from a lack of relationship between the intervening and dependent variable.

It is believed that the principal's succession pattern and reference group orientation affect his perceived need for change and perceived power to innovate in a manner similar to that of the secondary principal and the superintendent, but that the relationship of perceived need for change and perceived power to innovate to innovation is weaker.

The program of many districts appears to reflect the feeling that the elementary program should be the same in the various buildings. If this is true, a decision to innovate must be implemented in all units in the district. This requires agreement between buildings or the approval of a superordinate (coordinator of elementary education, assistant superintendent, superintendent, etc.). This reasoning leads to the conclusion that elementary principals have a lower perceived power to innovate than secondary principals. Individually, elementary principals are not significant determiners of innovation in their building.

The argument advanced above would seem to apply in the case of secondary schools when there is more than one high school in a district. This condition did not exist in most of the districts included in the sample. The desire for uniformity between units that encompass the same grade span facilitates program articulation and avoids the problem of explaining to the public the reason for differences between buildings.

The argument advanced above leads to the following untested hypothesis:

> The principal's power to innovate is inversely related to the number of administrative units (buildings) in the district providing education at the same grade level.

The Best Unit of Analysis

One of the purposes of the study was to determine whether the district or the building served as the more appropriate unit of analysis for investigations of innovation. This may be considered by viewing the amount of variance accounted for by different groups of variables.

Thirteen variables accounted for 38.6 per cent of the variance in secondary innovation. The 7 variables that are associated with the superintendent or characteristics of the district account for 23.8% of the variance and 6 variables associated with the principal or the building account for 20.8% of the variance. This finding indicates that the two groups of factors are of approximately equal importance and that they explain unique portions of the variance.

The best strategy for investigating secondary innovation would seem to be one which considers the building as the unit of analysis and the district as the supra-system of consequence. The analysis should include variables associated with both the superintendent and the district on the one hand and the principal and the building on the other. To omit either group is to leave out important factors which add materially to understanding.

In the case of elementary innovation, 13 variables account for 20.8% of the variance. The 7 variables associated with the superintendent or the district account for 9.1% of the variance and the 6 variables associated with the principal or the building account for 11.7% of the variance. As in the case of secondary innovation, the two sets of factors are of approximately equal importance. The fact that the total variance explained is equal to the sum of the variance explained by the two groups of variables indicates that they explain different portions of the total variance.

The most appropriate strategy for investigating elementary innovation would seem to be one which permits the inclusion of both district and building variables. This may be done by considering the building as the basic unit of analysis, but including district factors as a part of the analysis.

The .19 correlation between elementary and secondary innovation suggests that change at these two levels should receive separate attention. The analysis of either secondary or elementary innovation should include data related to both the district and the building.

The Relative Importance of the Superintendent and Principal

The relative importance of the principal and superintendent in innovation was examined in Chapter VI by considering the relative amount of variance that could be explained by 3 attributes of the superintendent and by the same attributes of the principal. The variables associated with the superintendent accounted for 7% of the variance in secondary innovation and those related to the principal accounted for 19%. For elementary innovation the amounts accounted for were: superintendent, 3%; and principal, 10%.

The analysis supports the conclusion that the affect of the principal upon the number of new practices adopted within a building is greater than the effect of the superintendent. The relatively small amount of the variance explained by these attributes argues for the importance of seeking additional attributes that are related. It also suggests the need for a broader approach which will include consideration of additional staff members.

The degree to which factors associated with the principal relate to building innovation depends upon the autonomy of individual schools. This autonomy is thought to be inversely related to the number of units providing education at a particular grade level.

There seems to be a desire in many districts to keep the program similar in all buildings providing education on the same level. Where this is true, decisions can not be made by the principals acting individually. Decisions must be made by the principals acting jointly or by a superordinate who has authority over all elementary schools. In either case, the autonomy of the principal is limited.

In large districts the most important person in determining elementary innovation may occupy a position in the bureaucratic structure between that of the superintendent and the principal. Data for examining the role of such administrators is not included in this study. This possibility argues for a generalized model that can be applied to any member of the staff.

Conclusions

The rationale of the study is based upon the assumption that the superintendent and principal play a significant role in the adoption of new practices. While this assumption was not tested directly, it is made tenable by the fact that hypotheses based upon this assumption were supported by the data.

The administrator's behavior relative to the adoption of new practices was thought to depend upon his perceived need for change and perceived power to innovate. Change was expected to occur only when the administrator both perceived a need for change and saw himself as having the power to bring about the change. The findings of the study demonstrate the value of these concepts.

An administrator's perceived need for change and perceived power to innovate are thought to be determined by personal attributes, characteristics of the organization, and the interaction between the individual and institutional variables. The institutional and individual dimensions of organizational behavior are similar to the nomothetic and idiographic dimensions of social behavior which were developed by Getzels and Guba (1957). The Getzels and Guba model may prove useful in developing a more general model of innovation. Such a model would have the advantage of viewing change as a special case of organizational behavior. This would make it possible to view innovation in the context of a broader theoretical framework.

A more general model would facilitate consideration of the part played by other persons in the social system. Other administrators and persons who do not occupy administrative positions may have an important role in the adoption of new practices. It may be useful to focus upon the role performed by various persons rather than upon their formal position.

The concept "perceived power to innovate" suggests the importance of considering the environment in which the individual and the institution exist. Numerous authors have indicated that the impetus for change usually comes from outside the social system. Changes external to the organization disturb the equilibrium which exists between the school and its environment. The creation of a new condition of equilibrium is attained through changes in the educational institution.

The 3 independent variables: tenure, succession pattern, and reference group orientation, related to the dependent variable in one or more of the analyses. None of these was found to be significant in all of the analyses. It is felt that these attributes of the administrator have been shown to be of some value in examining the relationship between the individual and the institution. The independent variables may also assist in the understanding of how others respond to the administrator.

The rationale for the study indicated that tenure, succession pattern and reference group orientation were expected to effect the administrator's knowledge of alternatives, commitment to the existing program, and integration into the social system. It may be useful in future studies to develop measures of these hypothetical constructs. This would help to fill a gap in the chain of reasoning. Other characteristics of the individual which might be investigated include open-mindedness, dogmatism, rigidity, and conservatism.

It may be useful in future attempts to develop a model to consider the change process as having two major components: a) the formation of individual attitudes toward change, and b) the decision-making process involved in adopting a new practice. The relationship between these two dimensions and those of the Getzels-Guba model are obvious.

Throughout the study, the relationships between individual variables and innovation have been small. Each individual variable accounted for only a small portion of the total variance. Collectively, the variables accounted for 41 per cent of the variance in secondary innovation and 21 per cent of the variance in elementary innovation. This is interpreted as indicating that the process of change is complicated and that it has many facets. It is further thought that the study succeeded in identifying a number of important aspects of the change process.

REFERENCES

Abbott, Max G. Hierarchial impediments to innovation in educational organizations. Paper presented at the Eleventh Career Development Seminar, Auburn University, October 27, 1964.

Becker, Howard K. The teacher in the authority system of the public school. In A. Etzioni, *Complex organizations: a sociological reader*. New York: Holt, Rinehart and Winston, 1961.

Blalock, Hubert M., Jr. *Causal inferences in nonexperimental research*. Chapel Hill, North Carolina: The University of North Carolina Press, 1964.

Blau, P. M. and Scott, W. R. *Formal organization: a comparative approach*. San Francisco: Chandler Publishing Company, 1962.

Bottenberg, R. A. and Ward J. H., Jr. *Applied multiple linear regression.* Lackland Air Force Base, Texas: 6570th Personnel Research Laboratory, Aerospace Medical Division, Air Force Systems Command, March, 1963.

Brickell, H. M. *Organizing New York State for educational change*. Albany, New York: State Education Department, 1961.

Bridges, Edwin M. Teacher participation in decision making. *Administrators Notebook*, Vol. XII, No. 9, May, 1964.

Brumbaugh, R. B. A test of the effectiveness of certain concepts from reference group theory in predicting teacher-attitude toward school district reorganization. Unpublished doctoral dissertation, The Pennsylvania State University, 1963.

Callahan, Raymond E. *Education and the cult of efficiency: a study of the social forces that have shaped the administration of public schools*. Chicago: University of Chicago Press, 1962.

Carlson, Richard O. *Adoption of educational innovations*. Eugene, Oregon: The Center for the Advanced Study of Educational Administration, University of Oregon, 1965a.

Carlson, Richard O. Barriers to change in public schools. *Change processes in the public schools*. Eugene, Oregon: The Center for the Advanced study of Educational Administration, University of Oregon, 1965b.

Carlson, Richard O. School superintendents and adoption of modern math: a social structure profile. In M. B. Miles (Ed.), *Innovation in education*. New York: Bureau of Publications, Teachers College, Columbia University, 1964.

Carlson, Richard O. Succession and performance among school superintendents. *Admin. sci. Quart*, 6, 210-227, September, 1961.

Chesler, Mark, Schmuck, Richard, and Lippitt, Ronald. The principal's role in facilitating innovations. *Theory into practice*, Vol. III, No. 5, 269-277, 1963.

Coch, Lester and French, John R. P. Overcoming resistance to change. Human relations, 1, 512-532, 1948.

Dill, William R. Decision-making. Yearb. nat. Soc. Stud. Educ. Chicago: The University of Chicago Press, 1964.

Getzels, Jacob W. and Guba, Egan G. Social behavior and the administrative process. The school review, LXV, 423-441, Winter, 1957.

Goetz, Francis R. Innovation and the public elementary school principal. Unpublished doctoral dissertation, Wayne State University, 1965.

Gouldner, Alvin Cosmopolitans and locals. Adm. sci. Quart., I, 2, 281-306, December, 1957.

Griffiths, D. E. Administrative theory and change in organizations. In M. B. Miles (Ed.), Innovation in education. New York: Bureau of Publications, Teachers College, Columbia University, 1964.

Griffiths, D. E. The elementary school principal and change in the school system. Theory into practice, Vol. II, No. 5, 278-284, 1963.

Gross, N., Mason, W. S., and McEachern A. W. Explorations in role analysis: studies of the school superintendency role. New York: John Wiley & Sons, 1958.

Guilford, J. P. Fundamental statistics in psychology and education. New York: McGraw-Hill, 1965.

Halpin, Andrew M. and Croft, Don B. The organizational climate of schools. Chicago: Midwest Administration Center, The University of Chicago, 1963.

Hemphill, John K, Griffiths, Daniel E., and Frederiksen, Norman. Administrative performance and personality. New York: Bureau of Publications, Teachers College, Columbia University, 1962.

Katz, Daniel and Kahn, Robert L. The social psychology of organizations. New York: John Wiley and Sons, 1966.

Lipham, J. M. Leadership and administration. In Yearb. nat. Soc. Stud. Educ. Chicago: The University of Chicago Press, 1964.

Mechanic, David The sources of power of lower participants in complex organizations. In W. W. Cooper, et. al. (Eds.), New perspectives in organizational research. New York: John Wiley and Sons, 1964.

Merton, R. K. Social theory and social structure. New York: The Free Press of Glencoe, 1957.

Miles, M. B. (Ed.) Innovation in education. New York: Bureau of Publications, Teachers College, Columbia University, 1964.

Mort, P. R. and Cornell, F. G. American schools in transition. New York: Bureau of Publications, Teachers College, Columbia University, 1941.

Reynolds, James A. Innovation related to administrative tenure, succession and orientation: a study of the adoption of new practices by school systems. Unpublished doctoral dissertation, Washington University, St. Louis, Missouri, 1965.

Rogers, E. M. Diffusion in innovations. New York: The Free Press of Glencoe, 1962.

Sutthoff, J. Local-cosmopolitan orientation and participation in school affairs. Unpublished Ph.D. dissertation, School of Education, Stanford University, 1960.

Todd, E. A. The administration of change: a study of administrative behavior. Houston: Bureau of Education Research and Services, University of Houston, 1963.

Walker, Helem M. and Lev, Joseph Statistical inference. New York: Holt, Rinehart and Winston, 1953.

Whiteside R. and Jennings, E. Multiple linear regression technique for analysis of variance: a working paper. Austin, Texas: Research Memorandum No. 8, Human Talent Research Project, Laboratory of Human Behavior, The University of Texas, October, 1963.

APPENDICES

APPENDIX A

THE QUESTIONNAIRES

QUESTIONNAIRE PERTAINING TO

THE SUPERINTENDENT'S ROLE IN EDUCATIONAL CHANGE

JAMES A. REYNOLDS
under the sponsorship of
THE GRADUATE INSTITUTE OF EDUCATION
Washington University
St. Louis, Mo.

Name ______________________ District ______________________

Enrollment ______________ No. of teachers ______________ Tax Rate ______________

Current expenditure per pupil ______________ Assessed valuation per pupil ______________

Age (circle): 20-29; 30-39; 40-49; 50-59; 60 or more

Salary (circle): 5000-7999; 8000-9999; 10,000-11,999; 12,000-13,999; 14,000-15,999; 16,000 or more

Number of continuous years in present position (count present year as one) ______________

Highest degree held: ______________ Graduate credit beyond this degree. ______________ semester hours / quarter hours

Year of most recent formal education ______________

Schools where training was received:

Name of school	Location

Position held immediately prior to present position:

Title: ______________________

District: ______________________

Location: ______________________

In general, would you say your present board is eager to adopt new educational practices, or is it very hesitant to adopt new practices?

| 1 2 3 4 5 6 7 |

Hesitant Eager

Please respond to the following questions by indicating with a check mark in the blank of the statement which more closely identifies you.

1. Do you usually feel more satisfied with a professional meeting in which there is a discussion about:

a controversial national educational issue ______________
a controversial local educational issue ______________

2. Do you usually feel more satisfied after a professional meeting which features:

an outstanding local speaker ____________
an outstanding outside speaker ____________

3. Some people have said that superintendents are of two types. Indicate by a single check in one of the blanks which type of superintendent you are like.

	I am a little like this type of superintendent	I am very much like this type of superintendent
Superintendent who is more interested in local problems.		
Superintendent who is more interested in problems everywhere.		

4. Indicate the frequency with which you read:

	Always	Usually	Sometimes	Never
"Phi Delta Kappan"				
"Overview"				
"The Nation's Schools"				
"The Educational Forum"				
"School Management"				

5. In the last five years, how many articles have you written for publication in magazines like those listed above?

____

6. How many times have you attended the National AASA Convention at Atlantic City in the last five years? __________

7. Rank the following in terms of their importance to you:

a. to be highly thought of by professionals over a wide geographic area.

b. to be highly thought of by fellow superintendents in the state.

c. to be highly thought of by local members of the school staff.

d. to be highly thought of by members of the local community.

1st________ 2nd________ 3rd________ 4th __________

8. Through which of the following sources do you normally first hear about new educational practices? List the three most important in order

1st________ 2nd ________ 3rd __________

a. university persons
b. local professional meetings
c. local board members or citizens
d. reports made at regional or national professional meetings
e. popular published sources (Life, Time, etc.)
f. visits to other schools
g. local staff members
h. professional published sources (Phi Delta Kappan, Overview, etc.)
i. fellow superintendents in the area

9. Which of the sources listed above would be most likely to cause you to give serious consideration to adopting a new practice? List the three most important in order

1st________ 2nd ________ 3rd __________

10. How much change in each of the following areas would you consider desirable in your district? Ignore financial limitations and possible resistance from the board of education, staff, or community.

KEY: EXT extensive change; MOD moderate change; MIN minor change; NO no change;

	EXT	MOD	MIN	NO
a) Elementary curriculum content and materials				
b) Secondary curriculum content and materials				
c) Education technology (programmed instruction, educational TV, language laboratories, etc.)				
d) Physical facilities				
e) Patterns of time use ("year around" schools, flexible scheduling, etc.)				
f) Teacher role definition (team teaching, teacher aides, etc.)				
g) Classroom composition (large group instruction, ungraded primary, etc.)				
h) Supplementary services (transportation, adult education, etc.)				
i) Structural changes in the pattern of administrative organization				
j) Procedures for evaluating the educational program				
k) Teacher selection and induction procedures				
l) In-service educational programs				

11. The superintendent can; by virtue of his position, training, and experience; influence the decisions that are made in his district. The superintendent, however, does not have absolute power in his district. The board of education, community pressure, and staff resistance may limit his range of control. In view of these factors, how much difficulty would you have in getting each of the following adopted? Assume you considered them desirable practices.

KEY: GR Great difficulty; CON Considerable difficulty; MIN Minor difficulty; NO No difficulty;

	GR	CON	MIN	NO
a) A 5% increase in the local tax rate				
b) A 15% increase in the local tax rate				
c) A major change in teacher role definition (team teaching, teacher aides, etc.)				
d) A major curriculum change				
e) A change in educational technology (programmed instruction, educational TV, etc.)				
f) A major improvement in physical facilities				
g) A significant change in teacher selection and induction procedures				
h) A new pattern of time use (year around school, flexible scheduling, etc.)				
i) A change in pupil assignment patterns (large group instruction, ungraded primary, etc.)				

12. If you considered an important change in your district to be desirable, how much influence do you feel that you could exert to overcome resistance from each of the following sources?

KEY: CM Considerably more than most superintendents you know
SM Slightly more than most superintendents
S About the same as most superintendents
SL Slightly less than most superintendents
CL Considerably less than most superintendents

	CM	SM	S	SL	CL
Other administrators					
Teachers					
Board of Education					
Community					

13. How interested are you in doing the following things:

KEY:	
NOT	Not at all interested
SLIGHT	Slightly interested
MODERATE	Moderately interested
VERY	Very interested
EXTREMELY	Extremely interested

	NOT	SLIGHT	MODERATE	VERY	EXTREMELY
a. Obtaining a superintendancy in a larger school system.					
b. Establishing a good reputation among my professional colleagues.					
c. Someday becoming president of the AASA.					
d. Remaining in my present position for the remaincar of my career.					
e. Taking every opportunity to advance my professional career.					
f. Taking a more important role in the activities of professional educational organizations.					
g. Obtaining a superintendency which would carry more prestige.					
h. Obtaining more recognition for my work from citizens of my community.					

QUESTIONNAIRE PERTAINING TO
EDUCATIONAL CHANGE

JAMES A. REYNOLDS
under the sponsorship of
THE GRADUATE INSTITUTE OF EDUCATION
Washington University
St. Louis, Mo.

Name ______________________ School ______________________ District ______________________

Enrollment ______________ No. of teachers ______________________ Tax Rate ______________________

Age (circle): 20-29; 30-39; 40-49; 50-59; 60 or more

Salary (circle): 5000-7999; 8000-9999; 10,000-11,999; 12,000-13,999; 14,000 or more

Number of continuous years in present position (count present year as one) ______________________

Highest degree held: ______________ Graduate credit beyond this degree ______________ semester hours / quarter hours

Year of most recent formal education ______________________

Schools where training was received

Name of school	Location

Position held immediately prior to present position:

Title: ______________________

District: ______________________

Location: ______________________

In general, would you say your superintendent is eager to adopt new educational practices, or is he very hesitant to adopt new practices?

Hesitant 1 2 3 4 5 6 7 Eager

Please respond to the following questions by indicating with a check mark in the blank of the statement which more closely identifies you.

1. Do you usually feel more satisfied with a professional meeting in which there is a discussion about:

a controversial national educational issue ______________

a controversial local educational issue ______________

2. Do you usually feel more satisfied after a professional meeting which features:

an outstanding local speaker ____________
an outstanding outside speaker ____________

3. Some people have said that principals are of two types. Indicate by a single check in one of the blanks which type of principal you are like.

	I am a little like this type of principal	I am very much like this type of principal
Principal who is more interested in local problems		
Principal who is more interested in problems everywhere		

4. Indicate the frequency with which you read:

	Always	Usually	Sometimes	Never
"Phi Delta Kappan"				
"The Elementary Principal"				
"The Bulletin of the NASSP"				
"Clearing House"				
"The Educational Forum"				
"The NEA Journal"				

5. In the last five years, how many articles have you written for publication in magazines like those listed above? ________

6. How many times have you attended the national elementary or secondary principals' convention in the last five years? ______

7. Rank the following in terms of their importance to you:

a. to be highly thought of by professionals over a wide geographic area.

b. to be highly thought of by fellow principals in the state.

c. to be highly thought of by local members of the school staff.

d. to be highly thought of by members of the local community.

1st________ 2nd________ 3rd________ 4th__________

8. Through which of the following sources do you normally first hear about new educational practices? List the three most important in order

1st________ 2nd________ 3rd________

a. university persons
b. local professional meetings
c. local board members or citizens
d. reports made at regional or national professional meetings
e. popular published sources (Life, Time, etc.)
f. visits to other schools
g. local staff members
h. professional published sources (Phi Delta Kappan, Overview, etc.)
i. fellow principals in the area

9. Which of the sources listed above would be most likely to cause you to give serious consideration to adopting a new practice? List the three most important in order

1st________ 2nd________ 3rd__________

Place a check mark to indicate the year in which each of the following became a regular part of the school program in your building. If the practice has since been discontinued write "DIS" in the space indicating the first year it was no longer used. If the practice has not been used in your building place a check in the last column.

	School year beginning In September of					
	1964	1963	1962	1961	1960 or earlier	Not Used
1. Modern Mathematics: New programs in mathematics such as those developed by the School Mathematics Study Group (SMSG), University of Illinois Committee on School Mathematics (UISM) and the Maryland and Ball State Programs.						
2. Algebra in Grade Eight: A full year of algebra in eighth grade for able students. (It is not necessary that this be in your building.)						
3. Language Laboratories: The simultaneous presentation of taped materials to a number of students in a manner that facilitates the oral-aural approach to languages.						
4. Science Programs: New programs in science such as the following: PSSC Physical Science Study Committee (Physics) CHEM study program (Chemistry) BSCS biological sciences curriculum study (Biology)						
5. Programmed Instruction: The use of curricular material which is composed into a program and presented to the pupil by a book, teaching machine, or recording, in small reinforced steps which accumulate.						
6. Team Teaching: Two or more teachers working together for all, or a significant part, of the instruction of the same group of students.						
7. Merit Pay: A salary plan which incorporates quality of service as a part of the basis for determining the salary of individual teachers.						
8. Large group Instruction: The combination of classes to form larger units of instruction for specific purposes.						
9. Teacher Aides: The use of non-certified personnel for the purpose of assisting the teachers.						
10. IBM Grade Reporting: The use of computers, contracted or operated by district personnel, for preparing grade reports for parents.						
11. IBM Scheduling: The use of computers, contracted or operated by district personnel, for sectioning students into classes or creating the master schedule.						
12. Structural Linguistics: Programs utilizing structural linguistics in English in place of traditional grammar.						

	School year beginning in September of					
	1964	1963	1962	1961	1960 or earlier	Not Used
13. Closed Circuit Television: The use of television programs produced within the local school district.						
14. Modular Scheduling: Dividing the school day into small time blocks or modules, for example: 20 minute units, and assigning different classes a varied number of time units depending upon the purpose of of the class.						
15. Free Period: Teachers have a "free" period for preparation, relaxation, etc.						
16. Remedial Reading: A special organized reading program available for remedial cases.						
17. Counseling: The assignment of a certified counselor to provide guidance services.						
18. Grouping: Formation of instructional groups on the basis of ability and/or prior achievement.						
19. Summer School: A summer program of academic instruction.						
20. Overhead Projectors: At least one overhead projector is available in the building for the use of the teachers.						
21. Driver Training: Included in the curriculum.						
22. Russian: Russian is included in the curriculum.						
23. Photocopy Machine: A photocopy machine is available, for use by teachers, in the building.						

List below any innovations which have been adopted in the last five years that are not included in the list presented above. Please indicate the year in which it was adopted and describe briefly.

QUESTIONNAIRE PERTAINING TO
EDUCATIONAL CHANGE

JAMES A. REYNOLDS
under the sponsorship of
THE GRADUATE INSTITUTE OF EDUCATION
Washington University
St. Louis, Mo.

Name ______ School ______ District ______

Enrollment ______ No. of teachers ______ Tax Rate ______

Age (circle): 20-29; 30-39; 40-49; 50-59; 60 or more

Salary (circle): 5000-7999; 8000-9999; 10,000-11,999; 12,000-13,999; 14,000 or more

Number of continuous years in present position (count present year as one) ______

Highest degree held: ______ Graduate credit beyond this degree ______ semester hours / quarter hours

Year of most recent formal education ______

Schools where training was received

Name of school	Location

Position held immediately prior to present position:

Title: ______

District: ______

Location: ______

In general, would you say your superintendent is eager to adopt new educational practices, or is he very hesitant to adopt new practices?

1 2 3 4 5 6 7

Hesitant ... Eager

Please respond to the following questions by indicating with a check mark in the blank of the statement which more closely identifies you.

1. Do you usually feel more satisfied with a professional meeting in which there is a discussion about:

a controversial national educational issue ______
a controversial local educational issue ______

2. Do you usually feel more satisfied after a professional meeting which features:

an outstanding local speaker ________
an outstanding outside speaker ________

3. Some people have said that principals are of two types. Indicate by a single check in one of the blanks which type of principal you are like.

	I am a little like this type of principal	I am very much like this type of principal
Principal who is more interested in local problems		
Principal who is more interested in problems everywhere		

4. Indicate the frequency with which you read:

	Always	Usually	Sometimes	Never
"Phi Delta Kappan"				
"The Elementary Principal"				
"The Bulletin of the NASSP"				
"Clearing House"				
"The Educational Forum"				
"The NEA Journal"				

5. In the last five years, how many articles have you written for publication in magazines like those listed above? ________

6. How many times have you attended the national elementary or secondary principals' convention in the last five years? ____

7. Rank the following in terms of their importance to you:

a. to be highly thought of by professionals over a wide geographic area.

b. to be highly thought of by fellow principals in the state.

c. to be highly thought of by local members of the school staff.

d. to be highly thought of by members of the local community.

1st________ 2nd________ 3rd________ 4th________

8. Through which of the following sources do you normally first hear about new educational practices? List the three m important in order

1st________ 2nd________ 3rd________

a. university persons
b. local professional meetings
c. local board members or citizens
d. reports made at regional or national professional meetings
e. popular published sources (Life, Time, etc.)
f. visits to other schools
g. local staff members
h. professional published sources (Phi Delta Kappan, Overview, etc.)
i. fellow principals in the area

9. Which of the sources listed above would be most likely to cause you to give serious consideration to adopting a new practice? List the three most important in order

1st________ 2nd________ 3rd________

Place a check mark to indicate the year in which each of the following became a regular part of the school program in your building. The practice has since been discontinued write "DIS" in the space indicating the first year it was no longer used. If the practice has not been used in your building place a check in the last column.

	School year beginning in September of					
	1964	1963	1962	1961	1960 or earlier	Not Used
1. Foreign Language in Elementary: Systematic instruction of foreign language to at least part of the pupils in the elementary schools.						
2. Modern Mathematics: New programs in mathematics such as those developed by the School Mathematics Study Group (SMSG), University of Illinois Committee on School Mathematics (UICSM) and the Maryland and Ball State Programs.						
3. Elementary Guidance: The assignment of one or more certified counselors to provide guidance services in elementary schools.						
4. Ungraded Primary: A primary unit in which traditional grade labels have been abandoned and in which the students progress from one level to another at their own rate of speed.						
5. Test Admission to Kindergarten: Admitting pupils to kindergarten on the basis of tests to determine readiness rather than a uniform age or birth date requirement.						
6. Team Teaching: Two or more teachers working together for all, or a significant part, of the instruction of the same group of students.						
7. Merit Pay: A salary plan which incorporates quality of service as a part of the basis for determining the salary of individual teachers.						
8. Programmed Instruction: The use of curricular material which is composed into a program and presented to the pupil by a book, teaching machine, or recording, in small reinforced steps which accumulate.						
9. Large Group Instruction: The combination of classes to form larger units of instruction for specific purposes.						
10. Teacher Aides: The use of non-certified personnel for the purpose of assisting the teachers.						
11. Closed Circuit Television: The use of television programs produced within the local school district.						
12. IBM Grade Reporting: The use of computers, contracted or operated by district personnel, for preparing grade reports for parents.						

	School year beginning in September of					
	1964	1963	1962	1961	1960 or earlier	Not Used
13. Physical Education Teacher: The use of a special teacher for instructing pupils in physical education.						
14. Art Teacher: The use of a special teacher for instructing pupils in art.						
15. Music Teacher: The use of special teacher for instructing pupils in music.						
16. Duty Free Lunch Periods: Teachers do not supervise pupils during their lunch hour.						
17. Overhead Projectors: At least one overhead projector is available, in the building for use by teachers.						
18. Photo Copy Machine: A photocopy machine is available, in the building, for use by teachers.						
19. Departmentalization: A modification of the self-contained classroom at one or more grade levels.						

List below any innovations which have been adopted in the last five years, that are not included in the list presented above. Please indicate the date when these innovations were adopted.

APPENDIX B

PRINCIPAL AXIS FACTOR MATRIX FOR THE 21 ITEMS FROM THE "PERCEIVED NEED FOR CHANGE" AND "PERCEIVED POWER TO INNOVATE"

TABLE 56

PRINCIPAL AXIS FACTOR MATRIX FOR THE 21 ITEMS FROM THE "PERCEIVED NEED FOR CHANGE" AND "PERCEIVED POWER TO INNOVATE"

(N=150)

Variable[a]	Factor							
	I	II	III	IV	V	VI	VII	VII
10 a	47	15	06	-44	13	-17	28	06
10 b	47	28	-08	-52	14	-13	29	06
10 c	54	06	10	27	-24	-27	10	-33
10 d	28	-04	-31	33	51	31	28	-08
10 e	59	19	06	19	15	15	07	-42
10 f	63	25	-08	21	-17	-23	18	-03
10 g	63	32	03	-01	-22	04	-21	-26
10 h	52	15	11	07	24	-36	-14	14
10 i	50	13	09	-11	43	-21	-29	15
10 j	55	07	13	17	-12	26	-51	08
10 k	52	05	25	04	-06	32	-05	49
10 l	50	-02	18	20	-21	32	40	34
11 a	-35	23	67	16	26	09	10	-05
11 b	-34	25	66	18	36	-04	08	-11
11 c	-24	78	-12	-05	15	00	-11	13
11 d	-26	50	-46	25	04	-06	08	12
11 e	-16	72	-18	29	-04	-08	01	16
11 f	-24	28	48	11	-41	-36	14	14
11 g	-18	57	-30	17	-05	-03	04	03
11 h	-07	51	12	-33	-21	42	13	-23
11 i	-12	77	08	-28	-04	20	-17	-09
eigenvalue	3.80	3.10	1.73	1.26	1.21	1.12	.97	.93

[a] The variable number corresponds to the item number in the superintendent's questionnaire.